OPERATIONAL MANUAL FOR MALARIA ACTION PROGRAMME (MAP)

1995

सत्यमेव जयते

GOVERNMENT OF INDIA

NATIONAL MALARIA ERADICATION PROGRAMME

(DIRECTORATE GENERAL OF HEALTH SERVICES)
MINISTRY OF HEALTH & FAMILY WELFARE,

22 - SHAMNATH MARG, DELHI - 110 054

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OPERATIONAL MANUAL
FOR
MALARIA ACTION PROGRAMME
(MAP)

1995

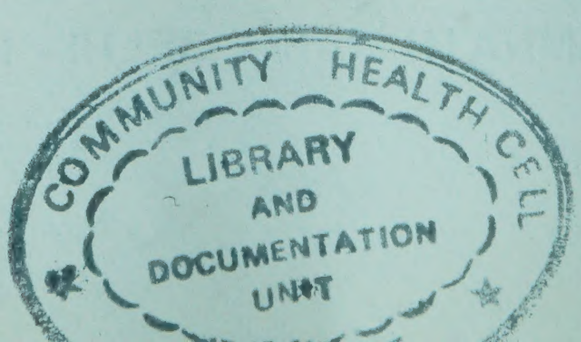
Dedicated to all the Workers Involved in Malaria Control

GOVERNMENT OF INDIA
NATIONAL MALARIA ERADICATION PROGRAMME
(DIRECTORATE GENERAL OF HEALTH SERVICES)
MINISTRY OF HEALTH & FAMILY WELFARE,
22-SHAMNATH MARG, DELHI - 110 054

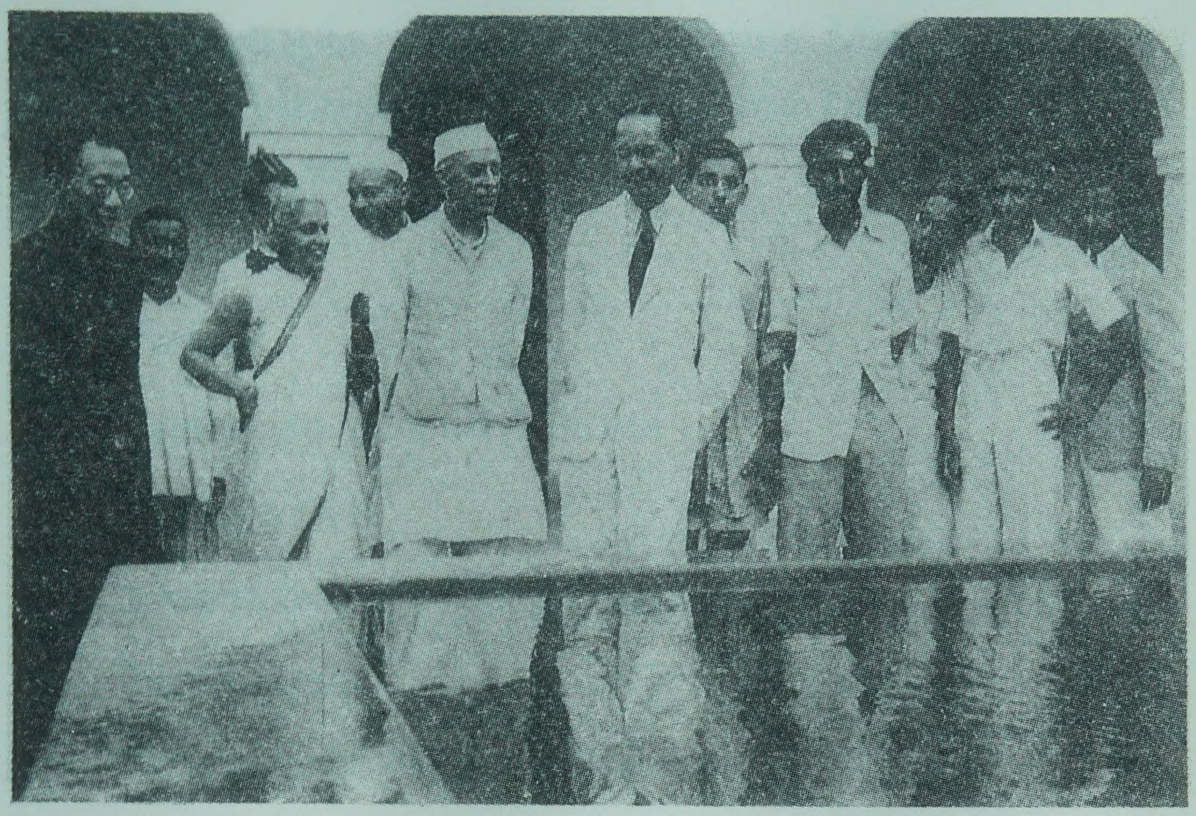
First Edition : March, 1995
Reprint : May, 1995
Second Edition : November, 1995

DIS-317 N95
05683

Designed & Printed by : **SHAKUN ENTERPRISES**, PH. 2918136



Pt. Jawaharlal Nehru's
Historical Visit to erstwhile Malaria Institute of India
(Presently National Institute of Communicable Diseases)



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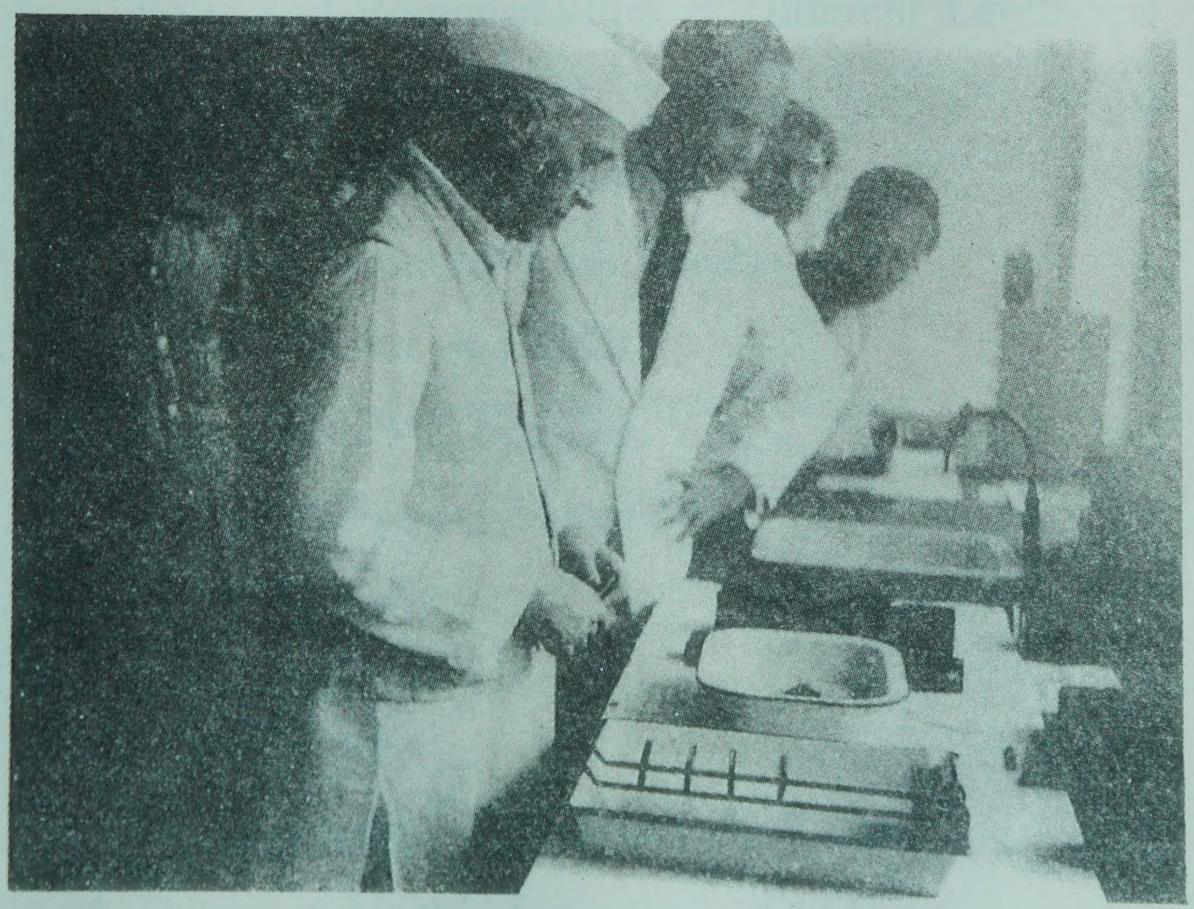

Panditji showing inquisitiveness in malaria research

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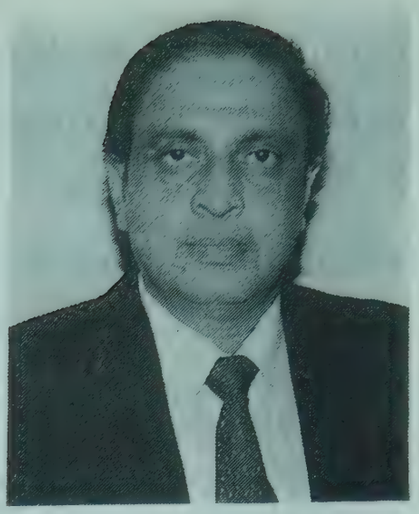


स्वास्थ्य सेवा महानिदेशायल
निर्माण भवन
नई दिल्ली - ११० ०११
DIRECTORATE GENERAL OF HEALTH SERVICES
NIRMAN BHAVAN
NEW DELHI - 110 011

Dated : 16th Nov., 1995

FOREWORD

Malaria was the major scourge in India contributing 75 million cases with 0.8 million deaths every year prior to the launching of National Malaria Control Programme in 1953. The National Malaria Eradication Programme was launched in 1958 which resulted in steep reduction in malaria incidence with 0.1 million cases and no malaria deaths in 1965. However, the resurgence of malaria in mid 70s escalated the incidence to 6.4 million cases in 1976 necessitating introduction of Modified Plan of Operation (MPO) in the succeeding year. MPO stabilised malaria incidence to around 2 million cases annually since the last one decade.

During 1994 some pockets in Rajasthan and North-Eastern States had experienced malaria epidemics causing spurt in malaria deaths. Consequently an Expert Committee was appointed by Govt. of India to identify high risk

problematic malarious areas and to suggest short-term remedial measures for different malaria paradigms at Subcentre level. The Expert Committee made recommendations in January, 1995 on the criteria for selection of high risk areas.

In pursuance of the Expert Committee Report, the Directorate of NMEP brought out **'Operational Manual for Malaria Action Programme'** for implementing the new control strategy recommended by the Expert Committee. I appreciate Dr. R.S. Sharma, Director, NMEP and all other Officers of the organisation having brought out the Operational Manual for the benefit of peripheral medical and para-medical personnel involved in malaria control within two months of the submission of Expert Committee Report. Copies of first edition (March 1995) and subsequent reprint (May 1995) have been distributed to the endemic States and there has been a great demand for more copies of the Operational Manual, realising its utility to the peripheral staff at District / PHC level. The present Edition has been brought out with suitable modifications to meet the demand from the States.

The guidelines have been amply supplemented with concise tables and appendices which shall serve as a practical guide book for all tiers of malaria workers. I recommend that the States may get the relevant portions translated in local language and distribute in the form of booklets to the respective peripheral workers for easy understanding and make intensified efforts to achieve 'Freedom from Malaria' in the near future.

(A.K. Mukherjee)

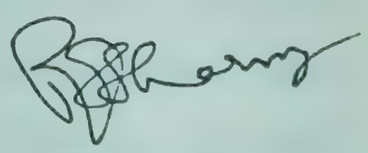
PREFACE

Malaria Institute of India carried out systematic studies in collaboration with the Health Directorate of erstwhile Bombay Presidency (Maharashtra and Gujarat) from 1945 to 1952, which formulated the strategy for malaria control programme in India. Subsequently, National Malaria Control Programme was implemented from 1953 to 1958. The spectacular success of Malaria Control Programme led to the launching of National Malaria Eradication Programme in India with effect from 1958. The success of NMEP was very evident when the country reached the lowest incidence (0.1 million malaria cases per annum) by the year 1965. Subsequently, the vertical National Malaria Eradication Programme was merged with the basic health services. Thereafter, there was a gradual increase during the subsequent years and by 1976, the total number of cases recorded were 6.4 million. The programme was reviewed indepth and the Modified Plan of Operation was introduced in 1977. This led to significant reduction in malaria incidence to a level of 2 million cases per annum by 1984, which has been maintained since then. The eco-system of the country has been constantly changing due to various developmental activities leading to the changing epidemiological pattern of malaria. During 1994, resurgence of malaria was observed in some of

the States with epidemics and increase in mortality. The programme was reviewed by the Hon'ble Prime Minister of India on 5th December, 1994 and he advised for a new direction to the programme. Further, he emphasised to give new thrust in the implementation of the programme. The Ministry of Health & Family Welfare, Government of India, appointed an Expert Committee in December, 1994 to identify the problem areas and formulate specific strategies to tackle problems in such areas. The Expert Committee submitted its report on 27th January, 1995. The Expert Committee Report highlights the epidemiological parameters to be considered to identify the high risk areas and has also suggested specific measures to be taken for different paradigms on malaria. The Malaria Action Programme (MAP) has been launched from 1995. This necessitated formulation of the "Operational Manual" that can be used by different tiers of workers in malaria control. This Manual has been prepared under the guidance of Dr. G.K. Sharma, former Director of NMEP, who has long innings of over three decades of work in malaria control and the Directorate of NMEP gratefully acknowledges his contribution in the preparation of this Manual. A large number of Officers from the Directorate of NMEP/States/Institutions/Consultants have contributed immensely by giving their valuable suggestions and also in preparation of this Manual during its printing phase. I am thankful to all those who have put in untiring efforts in making this publication possible at a short interval.

It is expected that this Manual will be of practical use for those who are engaged in malaria control programme activities. Any comments / suggestions to improve the Manual are most welcome, which will be incorporated in the future editions.

It may be mentioned here that the various issues discussed in this Manual shall act as broad guidelines only. Malaria is exclusively a local and focal phenomenon. The intensity of its transmission, prevalence and distribution of parasites & species are determined by local malariogenic conditions which differ from village to village, city to city and even from ward to ward in some localities. It is, therefore, essential to understand that the epidemiological approach to malaria control is of paramount importance. The local data and other situations are important in decision making process for action. It is expected that for all those who are engaged in malaria control programme, this Manual will act as a broad guideline and the decision for effective control shall have to be taken at the local level before implementing the control strategy with special reference to epidemiological analysis and prediction & containment of epidemic(s).



Delhi,
March, 1995

(R.S. Sharma)
Director, NMEP

PREFACE TO SECOND EDITION

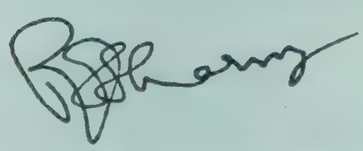
It is highly ameliorating to record that there had been a great demand from all States for the 'Operational Manual' and all the copies of first edition as well as the reprint were exhausted with in a short period. The States have been demanding more copies which necessitated to bring out the present edition (Second) of the manual. A few changes based on critical comments on the first edition offered by different experts have been incorporated in the second edition for which grateful thanks are expressed to all the experts. After printing the first edition and reprint, an Expert Committee on National Anti-malaria Drug Policy was constituted by Govt. of India under the Chairmanship of Director General of Health Services. The drug policy has been revised in the light of recommendations made by the Expert Committee. Additional chapters on Referral Services, Modified Plan of Operation and Epidemiological & Entomological Parameters have been added in the second edition, keeping in mind the needs of peripheral workers.

Hindi edition of Operational Manual is also being printed. The States may get the manual translated in the local language for the benefit of targeted peripheral workers who are not well conversant in English.

The new approach in malaria control strategy will have to be incorporated in the manpower development on malaria

control, so that the accelerated malaria action programme shall reap dividends in reaching the goal at the earliest.

I express my grateful thanks to Dr. G.K. Sharma, Dr. P.C. Gupta and Shri C.K. Rao, Consultants in the Dte. of NMEP and Dr. G.P. Singh Dhillon, Joint Director as well as the other Officers of the Dte. of NMEP in bringing out the second edition expeditiously with all the needful changes.



Delhi,
November, 1995

(R.S. Sharma)
Director, NMEP

OPERATIONAL MANUAL FOR MALARIA ACTION PROGRAMME

INTRODUCTION

In the year 1994, there were several focal epidemics of malaria with high mortality. Government of India, realising the urgency of the situation and need for a prompt corrective action, appointed an Expert Committee on Malaria in December, 1994.

The Committee was assigned the task of identification of worst affected/high risk malarious areas and to suggest short-term remedial measures. The action plan suggested in their report has been approved in principle by the Government of India.

The guidelines given hereunder are issued so that the State Health Authorities can judiciously apply the criteria for selecting the high risk areas and implement the action plan at the earliest.

The plan of action suggested for 'high risk' rural and urban areas will be implemented in the field immediately so as to have its impact during the ensuing transmission period.

2. IDENTIFICATION OF 'HIGH RISK' AREAS

The principal aim is to identify worst affected **'high risk'** malarious areas in the country. The Expert Committee has laid down the following criteria for the same:

2.1. RURAL AREAS

2.1.1. Recorded deaths due to malaria (on clinical diagnosis or microscopic confirmation) with *P.falciparum* infection during the transmission period **with evidence of**

locally acquired infection in an endemic area, during any of the last three years.

2.1.2. The Slide Positivity Rate (SPR) is to be used for the identification of areas as follows:-

a). Doubling of SPR during the last three years provided the SPR in second or third year reaches 4% or more

b). Where SPR does not show the doubling trend as above but the average SPR of the last three years is 5% or more

2.1.3. ***P.falciparum*** proportion is 30% or more provided the SPR is 3% or more during any of the last three years

2.1.4. An area having a focus of Chloroquine resistant ***P.falciparum***

A Chloroquine resistant PHC will be characterised by detection of more than 25% of R II and R III level cases in a minimum sample of 30 cases.

2.1.5. Tropical aggregation of labour in project areas

2.1.6. New settlements in endemic/receptive and vulnerable areas

*** Urban Areas : please see item 6.2 (page 77)**

2.2. SELECTION OF 'HIGH RISK' AREAS

The State Programme Officer should immediately issue instructions to the District Malaria Officers as well as Medical Officers in-charge of the Primary Health Centres to collect and compile subcentre-wise epidemiological information in the prescribed proforma at PHC in **Appendix-I.** The MO PHC will forward the same to DMO.

The District Malaria Officer in consultation with Chief Medical and Health Officer will then consolidate the information in proformae at **Appendix-II A, B, C.** He will fill-up information in respect of staff, microscopes, etc. from

the records available at PHC/District Headquarters and forward these alongwith proforma at **Appendix-I** to the State Programme Officer.

The information pertaining to State will then be compiled by the State Programme Officer. Having collected the PHC-wise data, the State Programme Officer in consultation with District Malaria Officer should apply **the criteria given above at 2.1 and any PHC fulfilling any one of the criteria should be included in the list of high risk areas** for the purpose of strengthening the infrastructure for case detection and training.

To illustrate the above statement, consider that out of several subcentres of a PHC, only one qualifies as high risk area. Then the population of entire PHC will be taken up for strengthening the infrastructure while the population of the qualifying subcentre alone will be taken up for short term intervention measures

For the purpose of spray operations and the calculation of insecticide, etc. the subcentre will be the area. A few examples are given at **Annex-12** which are self explanatory.

The State Programme Officer before forwarding the final proposal would consult the Regional Director, ROH&FW in the selection of 'high risk' areas and comments of ROH&FW should be sent along with the proposal to the Directorate of NMEP.

The State Programme Officer will consolidate the information for the State and communicate the same to the Director, NMEP in proforma at **Appendix-III.**

3. CASE DETECTION AND MANAGEMENT OF MALARIA CASES

This is the single most important activity at the periphery for preventing malaria mortality.

3.1. ROLES AND RESPONSIBILITIES AT DIFFERENT LEVELS

3.1.1. The role and work schedule of the Multipurpose Worker (MPW)-Male for Early Case Detection and Prompt Treatment (EDPT) should be as follows:-

a). He should have a village-wise population register of his subcentre for which MF-1 of MPO-NMEP should be adopted and updated every January. However, the existing register suggested by CBHI under the H.M.I.S. is adequate, wherever it is in operation.

b). He will have a fortnightly domiciliary house-to-house visit schedule developed by Medical Officer in-charge of PHC in consultation with the District Malaria Officer.

c). He will collect blood smears (thick and thin) from fever cases or cases with history of fever during domiciliary visits to households and keep the records in MF-2.

d). He will administer presumptive treatment to all cases from whom blood slides are collected and administer radical treatment to all positive cases and will ensure that the tablets given are swallowed in his presence.

e). He will advise seriously ill cases to visit PHC for immediate intensive treatment. All the fever cases with altered sensorium must be referred to PHC by him. The cases will be referred after collection of blood smear and administration of presumptive treatment.

f). He will contact all FTDs/DDCs/Voluntary Link Workers of his area during his visit to the village and collect blood smears and MF-2 for transmission to laboratory.

g). He will replenish the stock of microslides and/or drugs to FTDs and DDCs, wherever necessary.

h). He will keep the records of blood smears collected and patients given antimalarials in MF-2.

i). He will take all precautions to use properly sterilised needles and clean slides while collecting blood smears.

j). He will put stencil on the wall of each household with date & signature at the time of fortnightly domiciliary visits.

The above instructions are applicable to all rural areas under the Primary Health Care System in respect of control activities under MPO as well as revised strategy.

3.1.2. The Role and Work Schedule of FTD/DDC Holder

In high risk areas, selected for implementing short-term Malaria Action Programme, the case detection will be strengthened in the following manner :

There will be one Fever Treatment Depot (FTD) per 1000 population or part thereof, if the villages/hamlets are more than 3 kms apart. This will also depend on the availability of suitable candidate. Roles and other functions of FTD holder will be as under: (The DDC holder will have similar role except blood smear collection)

a). He will be completely voluntary in nature and a resident of the village.

b). He should be literate (knowing reading and writing), even if not formally educated.

c). He should be selected by Medical Officer incharge of PHC/District Malaria Officer preferably in consultation with the community leaders.

d). A signboard should be fixed at the residence of the

FTD holder.

e). He should be given training for one or two days at the PHC Headquarters in the collection of blood smears and administration of presumptive treatment.

f). He will collect blood smears (thick and thin) from all fever cases and cases with history of fever who report at his residence and keep the record in MF-2.

g). He will administer presumptive treatment to such cases as per drug schedule given to him and ensure that the drug is swallowed in his presence.

h). Each FTD will have a stock of 200 tablets of Chloroquine. The replenishment of drugs will be made by MPW/Voluntary Link Worker.

i). He will advise seriously sick cases to report to PHC for proper treatment. All the fever cases having altered sensorium must be referred to PHC. The cases will be referred after collection of blood smear and administration of presumptive treatment.

j). He will be supervised by the MPW (Male).

k). He will observe all precautions and use sterilised needles, clean slides, etc. while collecting blood smears and administering drugs.

3.1.3. The Role and Work Schedule of Voluntary Link Worker (VLW)

As recommended by the Expert Committee, it has been decided that in 'high risk' areas there should be a voluntary worker in the area who can co-ordinate activities of FTDs and ensure supplies of drugs and slides to them in time. He will be designated as **Voluntary Link Worker.**

a). Link Worker will be voluntary worker selected from the local community. He should be literate. He can be taken under the N.S.S/N.S.V. with relaxation of qualifications

for such schemes.

b). He will work as FTD for 1000 population or part thereof in his headquarters village.

c). His role in respect of Blood Smear Collection from fever cases will be similar to other FTD holders.

d). He will, **twice a week**, contact neighbouring FTD holders, collect the blood smears taken by them and take a copy of MF-2 pertaining to the blood smears. If other FTD/DDC holders cannot fill the forms properly, he will help them in maintaining their records properly and check the drug requirements.

e). He will carry the blood smears collected in his area to the nearest malaria laboratory - PHC or Malaria Clinic which is responsible for examining the blood smears collected in the area and hand over blood smears and MF-2 to the Laboratory Technician/Malaria Microscopist.

f).He will collect clean glass slides and antimalarials required by him and also for other FTD/DDC holders in his area and replenish the same.

g). He will be supervised by the MPW (Male) or any other Supervisor, a person designated by Medical Officer i/c of PHC.

3.1.4. Establishment of DDCs

If it is not possible to have FTD, the Medical Officer should establish DDC. The functions of DDCs are the same as those of FTDs, except that the DDCs do not take blood slides but administer drugs to fever cases. For example Anganwadi Worker or any other volunteer may function as DDC or FTD depending on the level of education. On the other hand, the functionaries like teachers or equivalent are expected to take the responsibility of FTD.

Thus for 3000 population in "High Risk" areas the blood smear collection and availability of antimalarials will be ensured by the Voluntary Link Worker, even if the MPWs are not in position immediately according to the norm under Primary Health Care System.

Under MPO, the DDCs and FTDs were established in many areas all over the country which should be activated and this practice should continue. There is no need to establish Voluntary Link Workers except in high risk areas.

3.1.5. Role of MPW (Female)

MPW (Female) will be responsible for collecting blood smears from all antenatal and postnatal cases under her care as well as from infants. She will, therefore, carry out the following functions :-

a). During her antenatal and postnatal follow-up visits, if a pregnant woman has history of fever or has fever, she will collect from her, thick and thin blood smear and keep records in MF-2.

It should be kept in mind that malaria is a very serious complication in pregnancy and postpartum period leading to high mortality.

b). She will administer the prescribed presumptive treatment immediately.

c). If any other fever case or case with history of fever is found among the members of the household, she will collect blood smear for microscopic diagnosis and give presumptive treatment.

d). She will take the blood smears to the nearest Malaria Clinic/PHC laboratory on priority within 24 to 48 hours.

e). She will obtain the results of blood smears and give radical treatment to malaria positives with the following exception :

Radical treatment should not be administered to pregnant women and during postpartum period of 30 days and also to infants (below one year of age).

f). She will refer the seriously ill cases immediately to PHC/other nearest referral centre for proper treatment. All the fever cases having altered sensorium must be referred to PHC. The cases will be referred after collection of blood smear and administration of presumptive treatment.

3.1.6. Activated Passive Surveillance

Case detection through Malaria Clinics and other institutions:

With decentralisation of malaria microscopy, it is envisaged that in **'high risk'** areas the malaria microscope facility is to be established at the proposed site for new/ mini PHC (@ one for 20,000 population in tribal areas and one for 30,000 population in plain areas).

After establishment of required FTDs, Voluntary Link Workers and filling-up the posts of MPW (Male), the blood smear collection will go up and this work load will be beyond the capability of one Laboratory Technician presently posted at PHC. Therefore, the Malaria Clinics with microscopic diagnostic facility are to be decentralised to the proposed new/mini PHC site, even if the new/mini PHC cannot be established immediately.

At the PHC laboratory, malaria clinic, dispensaries, district and sub-divisional hospitals, etc., all fever cases should have their blood smears examined for malaria parasite.

3.1.7. Laboratory Services

The Role of the Malaria Microscopist/Laboratory Technician at PHC or Malaria Clinic will be as under:-

a). At Malaria Clinic, the Malaria Microscopist will collect blood smears from all fever cases reporting at the Clinic, examine them immediately and administer antimalarials. He will, if necessary, recall the patient on subsequent days for completing full radical treatment.

b). He will collect blood smears from fever cases reporting to him or referred to him by the Medical Officer(s) and maintain their records in MF-2.

c). He will receive all blood smears along with MF-2 sent by the peripheral staff of the PHC.

d). He will stain the blood smears with J.S.B.Stain.

e). He will examine microscopically 100 fields of thick smear of the stained blood slide which takes about 5 minutes before the slide is declared positive or negative. Examination of 100 fields is technically essential for identification of species and stage(s) of malaria parasite.

f). In his report, he will indicate the stages of malaria parasite found in the blood along with the species.

g). In serious and complicated *P. falciparum* cases, he will record the density of parasites per 100 fields of thick smear.

h). He will maintain the records in MF-7, 8 and 9 registers.

i). He will send back the copy of MF-2 to the periphery within 48 hours of examination, if possible through MPW (Male), Voluntary Link Worker or Health Supervisor with results of microscopic examination for prompt rad-

ical treatment.

j). He will maintain subcentre-wise and PHC-wise charts as prescribed under MPO (See Appendix-VII).

k). He will clean old and new glass slides and supply replenishments to MPWs (Male & Female), FTDs and Voluntary Link Workers or any other passive or voluntary (i.e. NGO) blood smear collecting agency.

l). He will maintain the stock register of antimalarials and also keep sufficient stock for replenishment to MPWs (Male and Female), FTDs, DDCs and Voluntary Link Workers.

m). He will keep stock of staining material and use them with care. (The detailed instructions already issued in the Booklet on Laboratory Services by the Directorate of NMEP should be followed meticulously).

3.1.8 Supervision of Laboratories and Cross-Checking

The Expert Committee has commented very strongly about supervision and efficiency of laboratories. The States are requested to provide a Laboratory Supervisor @ one for four Lab.Technicians as recommended by the Expert Committee by making appropriate provision.

Since there is already a provision of 10% leave reserve of Laboratory Technicians under MPO, it is decided that meanwhile for a group of 10 PHCs or part thereof, there will be a Laboratory Supervisor. This can be adjusted within the 10% leave reserve of Laboratory Technicians till additional posts are created in the light of Expert Committee recommendations.

The Supervisory Laboratory Technician can be posted either at District/Zonal/State Headquarters level depending on work load and State requirements. His functions will be as under:-

a). He will visit every PHC at least once a month.

b). His tour schedule will be chalked out so that each laboratory is visited once a month for two days.

c). He will inspect and conduct on the spot corrections in regard to laboratory records, returns, material and equipment.

d). He will cross-check the work done by PHC/Malaria Clinic Technicians during his visit to assess and improve the efficiency of these Technicians.

e). While at his headquarters, he will cross-check positive and negative slides received from periphery.

f). He will see that good quality J.S.B. Stain is prepared and sent to PHC laboratory.

g). He will check whether the stain is filtered every day before use.

3.1.9. Cross-Checking of Laboratory Results

a). **All blood smears found positive at the PHC or other peripheral laboratories should be cross-checked for parasite species and stage.**

b). A sample of negative slides are also to be cross-checked.

c). It is envisaged that all positives and 10% of all negative blood smears examined at PHC/Malaria Clinic will be cross-checked.

d). Code number for cross-checking.

i). The Zonal Officer will issue the code number (last digit) every month in the first week.

ii).The PHC/Malaria Clinic Laboratory Technician will collect all negative slides examined during the previous month with number ending with the code digit and despatch to the concerned cross-checking laboratory by 10th of the month.

e). The State Programme Officer in consultation with Zonal Officer(s) will decide where the cross-checking of blood smears from a PHC will be carried out.

f). Normally, it is expected that cross-checking will be distributed as under:-

i). All positive blood smears should be cross-checked at ROH&FW and State Headquarters Laboratories. These can be shared 50:50 depending on work load and it may be mutually adjusted by the State Malariologist and Regional Director, ROH&FW.

ii). The sample of 10% negatives can be distributed between State/Zonal - 8.5% and ROH&FW-1.5%.

iii).The remaining blood smears are preserved by PHC/ Malaria Clinic till cross-checking results are received back.

iv). In case of high discrepancy rate i.e. 2% or above, the State Programme Officer and Regional Director, ROH&FW will take suitable remedial measures.

v). The results of cross-checking examination should **be sent to the concerned laboratory by 10th of the succeeding month.**

Proforma for Cross-Checking

Name of PHC _____ Name of District_____

Month of B.S.C._____

S.No.	Blood Smear No.	Quality		Result		Remarks
		Smear	Stain	PHC	Cross-Check Organisation	

Date:

Signature of the cross-checking Lab. Technician

3.1.10. The Role of Health Supervisor of PHC

a). He will supervise all activities of MPW (Male).

b). He will do concurrent and consecutive supervision of domiciliary visits of MPW (Male).

c). He will ensure that DDCs/FTDs/Voluntary Link Workers are contacted regularly by MPW (Male). If the post of MPW is vacant, he will contact the FTDs/DDCs/ Voluntary Link Workers.

d). He will administer radical treatment to all positive cases in his area.

e). He will refer seriously ill cases to the referral centre.

MPW (Male & Female)/FTD/DDC/VLW/NGO/ Microscopist/Health Supervisor will immediately inform unusually high fever /positive incidence to MO PHC

3.1.11. The Role of PHC Medical Officer

He is the kingpin in early case detection and prompt treatment mechanism in rural areas. He should be well trained and take keen interest in this activity. To fulfill the duties under the Primary Health Care System, he should carry out the following activities :-

a). He will, in consultation with District Malaria Officer and the community, select FTD/DDC holders and Voluntary Link Workers for his PHC.

b). He will also select headquarters of DDCs, FTDs and Voluntary Link Workers.

c). He will make a fortnightly calendar for house-to-house visit of MPW (Male) in consultation with DMO.

d). He will refer all fever cases to malaria laboratory for blood smear collection and examination before giving final prescription/medicines.

e). He will supervise all Malaria Clinics and PHC laboratory in his area, see the quality of blood smear collection, staining, efficiency of microscopic examination and check whether the stain is filtered daily.

f). He will ensure that the Laboratory Technicians maintain MF- 7, 8 and 9 registers and also other charts and graphs showing subcentre-wise and passive agency-wise blood smear collection, examination and positive cases.

g). He will also ensure/supervise that all positive cases get radical treatment within 48 hours of examination.

h). He will also ensure that sufficient stocks of antimalarials including Quinine tablets and injectable Quinine are available in PHC and periphery.

i). He will, while supervising the malaria laboratory (either at PHC or at Malaria Clinic) look into the condition of microscope and other equipment, stains, glass slides, etc.

j). While on tour, he will verify that MPW (Male) and MPW (Female) carry out malaria case detection as laid down in this manual.

k). He will do data analysis for action and prediction of outbreak and also assist in epidemiological investigation.

l). He will provide referral services to severe cases of malaria.

m). He will refer severe and complicated cases to District Hospital, if the treatment facilities are not available at PHC/CHC.

n). He should monitor the drug failure in malaria cases (failure of response to Chloroquine) and inform the District and State Headquarters immediately.

o). He will ensure that records of clinically diagnosed cases are maintained.

3.2. DIAGNOSIS AND TREATMENT OF MALARIA CASES

All fever cases attending PHC/Dispensaries/Hospitals for treatment should be presumed to be suffering from malaria. Therefore, in case laboratory diagnosis is not immediately possible, the differential diagnosis on clinical grounds should be made and reports should be sent regularly to NMEP organisation of State/Centre as is applicable. All malaria cases do not present with classical sign & symptoms. Malaria symptomatology is modified by the immune status, age, sex, pregnancy as well as presence of any other concomitant infection(s). Therefore the patients from different paradigms of malaria will show variable symptoms. Some apparently healthy persons with slight headache may be positive for malaria. However on the basis of following clinical sign & symptoms, fever cases can be labelled as malaria cases:-

3.2.1. Guidelines for Reporting of Clinical Malaria Cases and Deaths.

Suspected Malaria Cases :	All fever cases unless otherwise proved.
Probable Malaria Cases : clinically diagnosed by Medical Officers	Fever cases **without** the following associated symptoms and not subjected to microscopic examination will be reported separately as clinical malaria. 1. Cough - Acute respiratory infections 2. Cold with running nose 3. Skin rash suggestive of eruptive illness 4. Burning micturition 5. Skin infections e.g. boils, abscess, infected wounds

6. Painful swelling of joints

7. Ear discharge

Seriously sick Malaria Cases

-The seriously sick malaria cases are those who present with following sign & symptoms :

- Cerebral malaria - Case of unarousable coma not attributable to any other cause in a patient with ***P. falciparum*** infection

Other cases, with hyperpyrexia, convulsions, severe anaemia, pregnancy with fever, pulmonary oedema in ***P. falciparum*** infection, hyperparasitaemia and malaria haemoglobinuria

Deaths due to Malaria

-Deaths due to malaria are only due to ***P. falciparum*** infection.

- Deaths are very common in Cerebral Malaria Cases

- If any fever case having sign and symptoms cited above dies without microscopic confirmation, the death can be attributed to malaria.

Confirmed Malaria Death

- Death of microscopically confirmed ***P. falciparum*** infected patient due to any of the complications mentioned above

In case blood smear has been taken and found negative for *P.falciparum*, the death should not be labelled as due to malaria on the basis of clinical diagnosis alone. If slide is positive for *P.vivax/P.malariae,* then also the death should not be labelled as due to malaria.

3.2.2. Presumptive Treatment

The presumptive treatment is given to all fever cases or cases with history of fever during past 15 days immediately after the blood smear is collected. It is to be given to all persons whatever be the age or sex. Even pregnant women in any month of pregnancy or during postpartum period should receive presumptive treatment. The presumptive treatment is also to be administered to fever cases where the blood smears are not collected as in the case of DDCs, etc.

All FTD/DDC holders, Voluntary Link Workers, MPWs (Male/Female), Health Supervisors (Male/Female), Laboratory Technicians and PCD will give presumptive treatment.

a). **Presumptive treatment in low risk areas comprises of** a single dose of Chloroquine phosphate @ 10 mg/kg. b.w.

ADULT DOSE
- A Single Dose of Chloroquine Phosphate - 600 mg (4 Tablets)
- THIS IS ADMINISTERED BY ALL AGENCIES

The age-wise dosage of Chloroquine for presumptive treatment @ 10 mg/kg.body weight

Age in years	Tablet Chloroquine Phosphate	
	mg base	No. of Tablets
<-1	75	1/2
1-4	150	1
5-8	300	2
9-14	450	3
15 & Above	600	4

b. (i). Presumptive treatment in high risk areas up to the subcentre level is as follows:-

25 mg/kg b.w. of Chloroquine base over three days (10 mg/kg.b.w. each on first and second day and 5 mg/kg.b.w. on

third day) along with a single dose of Primaquine 0.75 mg per kg b.w. on the first day. This drug regimen is to be followed-up to the subcentre level in all high risk areas of the country identified as per criteria laid down by the Expert Committee - 1995.

The age-wise dosage is as follows:-

Age in years	First day		Second day	Third day
	Chloro-quine mg base	Prima-quine mg base	Chloro-quine mg base	Chloroquine mg base
< - 1	75	nil	75	37.5
1 - 4	150	7.5	150	75.0
5 - 8	300	15.0	300	150.0
9 -14	450	30.0	450	225.0
15 & above	600	45.0	600	300.0

Note : Pregnant women and infants are not to be given Primaquine.

b. ii). Presumptive treatment in high risk areas by DDCs, FTDs and VLWs :-

The FTD and DDC holders as well as Voluntary Link Workers will administer 10 mg/kg b.w. of Chloroquine base in a single dose without Primaquine as is followed in the low risk areas.

c). **The presumptive treatment in areas with *P.falciparum* resistant strain** where Drug Policy of NMEP has been modified -1995, will be as under at different levels :-

PRESUMPTIVE TREATMENT IN RESISTANT AREAS

Adult Dose

S. No.	Agency	Presumptive Treatment	
		Drug	Dose
1.	DDCs,FTDs & VLWs	Chloroquine	600 mg as a single dose
2.	ACD MPW (Male & Female) Health Supervisor (M & F)	Chloroquine + Primaquine	1500 mg in 3 divided daily doses i.e. 600 mg each on 1st and 2nd day & 300 mg on 3rd day with a single dose 45 mg Primaquine on 1st day
3.	PCD* PHC Medical Officer OPD	Sulphalene/ Sulphadoxine+ Pyrimethamine	1500 mg + 75 mg as a single dose

***In case microscopic diagnosis is not available immediately at a PCD, the presumptive treatment should be Chloroquine plus Sulpha combination because Sulpha combination has very little action on *P.vivax*.** However, the person administering the presumptive treatment will ensure that Sulpha combination tablets are swallowed in his presence and he will advise the case to consume Chloroquine tablets soon thereafter.

Considering that Amodiaquine has no advantage over Chloroquine in treatment of resistant strain of *P.falciparum* and also the toxicity associated with this drug on prolonged administration, Amodiaquine has been withdrawn from NMEP.

3.2.3. RADICAL TREATMENT

All microscopically positive cases of malaria are to be given radical treatment with Primaquine for its gametocytocidal and anti-relapse properties. This ensures a complete cure from malaria in the positive case and makes him non-infective to mosquitoes. However in high risk areas, the fever cases given three days presumptive treatment i.e 1500 mg Chloroquine and 45 mg Primaquine (adult dose), and later found positive for ***P.falciparum*** need not be given radical treatment.

a). **Radical Treatment for *P.vivax*, *P.malariae* and mixed infections:**

The adult dose/drug schedule is as follows:-

A single dose of 600 mg Chloroquine (10 mg/kg.body weight) and 15 mg Primaquine (0.25 mg/kg. body weight) on the first day followed by 15 mg Primaquine (0.25 mg/kg. body weight) daily for the next four days.

The Age-wise dosage of radical treatment

Age in years	Tablet Chloroquine 150 mg base		Tablet Primaquine 2.5 mg base	
	Single dose		Daily dose for 5 days	
	mg base	No. of Tablets	mg base	No. of Tablets
< - 1	75	½	nil	nil
1 - 4	150	1	2.5	1
5 - 8	300	2	5.0	2
9 -14	450	3	10.0	4
15 - >	600	4	15.0	6

In high risk areas where presumptive treatment with 1500 mg Chloroquine has been given and the patient is found positive for *P.vivax*, dose of Chloroquine - 600 mg need not be administered but 5 days schedule of Primaquine must be given.

LIST OF DISTRICTS ALREADY BROUGHT UNDER ALTERNATIVE DRUG SCHEDULE

Sl. No.	Name of the State	Name of the District	Pop. (Distt)
1.	A & N Islands	G.Nicobar L.Nicobar	19,336 87,826
2.	Assam	Karbi Anglong Nagaon	6,24,000 18,58,000
3.	Arunachal Pradesh	Lohit	87,000
4.	Maharashtra	Chandrapur	17,81,000
5.	Meghalaya	All districts except *Jaintia Hills	15,38,000
6.	DNK Project	Covering areas of Madhya Pradesh and Orissa	2,12,000
7.	Orissa	**Keonjhar	12,72,000
8.	Nagaland	All districts	12,15,000
9.	Uttar Pradesh	***Mirzapur	1,82,000
		Total	**88,76,162**

* Drug policy not changed.
** Covering Keonjhar town only.
*** NTPC Shaktinagar only.

INTRODUCTION OF ALTERNATIVE DRUG SCHEDULE IN PHCs OF MIZORAM STATE DURING 1990

Sl. No.	Name of the District	Chloroquine Resistant Status						Population	
		Name of the PHC with resistant foci	Year	No. of Subjects Tested	% R II	% R III	Total	Distt.	PHC
1.	Aizawl (West)	Sairang	1988	23	8.7	26.1	34.8%	2,72,304	3,527
2.	Lunglei	Hnahthial	1989	24	4.2	33.3	37.5%	1,04,391	15,329
								Total	18,856

LIST OF ADDITIONAL PHCs RECOMMENDED FOR ALTERNATIVE DRUG SCHEDULE IN MAP - 1995

Sl. No.	Name of the State	Name of the District	Chloroquine Resistant Status						Population	
			Name of the PHC with resistant foci	Year	No. of Subjects Tested	% R II	% R III	Total	*Distt.	PHC
1.	Arunachal Pradesh	Tirap	Jairampur	1982	30	20	10	30%	85,508	70,000
2.	Gujarat	Panchmahal	Kadana	1993	31	19.4	16.1	35.5%	32,56,100	56,021
3.	Karnataka	Kolar	Gulur	1992	58	27.6	20.6	48.2%	22,16,889	38,812
4.	Maharashtra	Raigarh	Washi	1991	31	19.3	16.1	35.4%	18,24,816	24,372
5.	West Bengal	Purulia	Ajodhya Hills (Bogmundi)	1993	37	13.5	18.9	32.4%	22,24,577	78,900
6.	West Bengal	Jalpaiguri	Uttar Latabari (Kalchini)	1990	32		34.8	34.8%	28,00,543	1,72,728
									Total	4,40,833

* As per Census of India - 1991.

b). **Radical Treatment for *P.falciparum* infection:**

If the load of malaria positive cases is very high in an area, ***P.falciparum*** cases who were given a single dose of Presumptive Treatment with 600 mg Chloroquine (i.e. 10 mg/kg.b.w.) should be given full radical treatment on priority.

The Adult dose is:-

- 1500 mg Chloroquine in three divided daily doses (i.e. 600 mg each on Ist and 2nd day & 300 mg on 3rd day) plus 45 mg Primaquine on first day. This dose is suitably adjusted for other age groups.

CAUTION : INFANTS AND PREGNANT WOMEN ARE NOT TO BE GIVEN PRIMAQUINE

c). The radical treatment of cases in Chloroquine resistant strain areas for *P.falciparum* as suggested under the revised Drug Policy is as follows:-

Adult Dose

Sulphalene/Sulfadoxine	1500 mg	
+		Single dose
Pyrimethamine (3 tablets)	75 mg	
	Thereafter	
Primaquine	45 mg	Single dose

These drugs should be given cautiously and not on the same day as both are known to precipitate haemolytic crisis in sensitive cases with G6PD deficiency. The drug administrator should ensure that the patient swallows Sulpha combination tablets in his presence and gives clear instructions to the patient to consume Primaquine tablets on the following day without fail.

The agewise dosage is as follows:

Age in years	Sulphalene/ Sulphadoxine + Pyrimethamine		Primaquine	
	mg base	No. of Tablets (500mg+25 mg)	mg base	No. of Tablets (15 mg)
1	2	3	4	5
> 1	125 mg + 6.25 mg	1/4	nil	nil
1-4	500 mg + 25 mg	1	7.5 mg	1/2
5-8	750 mg + 37.5 mg	1½	15.0 mg	1
9-14	1000 mg + 50 mg	2	30.0 mg	2
15 & above	1500 mg + 75 mg	3	45.0 mg	3

In cases resistant to above drugs, and in severe & complicated malaria with *P.falciparum* infection (microscopically confirmed) I.V. Quinine is to be used in doses given below:-

Dosage of Quinine dihydrochloride I.V.

Quinine 10 mg/per kg b.w. thrice daily as intravenous infusion in 5% dextrose/glucose solution over 4 hours.

When patient regains consciousness, same dose schedule is given orally to complete 7 days treatment.

However, even in this area, the radical treatment to ***P.vivax*** will remain the same i.e. Chloroquine @ 10 mg/kg. b.w. on first day and Primaquine @ 0.25 mg/kg. b.w. daily from 1st day to 5th day.

Note: The map of areas of *Pf* resistance to Chloroquine is given in Page 220. Alternative drug schedule areas are given in Pages 22 to 24.

3.2.4 Use of New antimalarials by Registered Medical Specialists

1. Mefloquine can be used only for treatment of ***P.falciparum*** cases resistant to Chloroquine and not for ***P.vivax*** cases but it should be mandatory that Mefloquine is issued only on the prescription by a qualified Registered Medical Specialist and the prescription is supported by laboratory report issued by a qualified Parasitologist indicating that there are ***P.falciparum*** rings (and not gametocytes alone) in the peripheral blood smear.

2. Artemisinin and its derivatives can be used in management of severe and complicated ***P.falciparum*** infection in areas of resistant foci. The drug is to be made available in injectable form to prevent its misuse and careful monitoring of its distribution system is imperative.

3.2.5 Chemoprophylaxis

No true chemoprophylactic drug is available which acts directly on 'Sporozoites' which prevents establishment of malaria infection in man (absolute prophylaxis). All antimalarials which are used for clinical chemoprophylaxis are schizonticidal drugs which do not prevent malaria infection but suppress appearance of clincial symptoms by acting on erythrocytic stages. Therefore, **a good suppressive drug should have the following qualities.**

a). It should be fast acting against erythrocytic stages.

b). It should have long half life so that frequent drug administration is not necessary.

c). It should not be toxic in the dosage required for suppressive treatment over prolonged period.

Drawbacks:

1. At present no such drug is available although 4-aminoquinolines are fast acting and safe enough. The Sulpha group with Pyrimethamine combination is quite effective but not safe due to the toxic reaction if taken for a long period of time. People who are allergic to Sulpha drugs may develop skin lesions or agranulocytosis which at times may be fatal. The 4-aminoquinoline group of drugs produce skin reaction and permanent changes in eye - neuro-retinitis, if taken continuously for a number of years. Quinine is not suitable as it is to be administered more frequently and risk of Quinine toxicity and its severity is much more.

2. The other drawback is that continuous uninterrupted drug compliance over a prolonged period during transmission period cannot be ensured.

3. Discontinuation of treatment leads to breakthrough which may go untreated for long time.

4. If the drug schedule is not strictly followed, chances of selecting a resistant strain of *P.falciparum* in the area increase. Therefore, the suppressive treatment or chemoprophylaxis is not recommended for those who are permanent residents of meso or hyperendemic areas. **Most appropriate group who are benefitted by the chemoprophylaxis are :-**

*a). Tourists/travellers from non-malarious areas to malarious areas.

*b). Military or Paramilitary groups moving into malarious areas.

*Caution: - The chemoprophylaxis or suppressive treatment should

be started a week before departure and not to be terminated immediately after leaving the malarious area and should be continued for at least 4 weeks more irrespective of the fact that the person is afebrile and not positive for malaria parasite.

c). Pregnant women in endemic and hyperendemic areas - chemoprophylaxis to be started after first trimester of pregnancy and continued for one month after child birth. However before commencement of chemoprophylaxis, if a pregnant woman is found positive, give full course of chloroquine. In the event of break-through during chemoprophylaxis, investigate drug compliance and administer full treatment with second line of drug.

Chemoprophylaxis should be terminated with radical treatment schedule of 5 days at the recommended dosage

1. The drug of choice for chemoprophylaxis is:

a). **Chloroquine Sensitive areas**

Chloroquine	Dosage schedule
	10 mg/kg.b.w. as loading dose and thereafter
	5 mg/kg b.w. at weekly intervals.

Not recommended beyond three years because of cumulative toxicity.

b). **Chloroquine Resistant areas**

*Chloroquine	5 mg/kg b.w. at weekly interval
+	(300 mg- adult dose)
Proguanil	1.5 mg/kg b.w. daily
	(100 mg - adult dose)

*Note : Since Proguanil is to be taken daily, drug compliance is poor.

2. Amodiaquine is not recommended for chemoprophylaxis because prolonged use of this drug produces serious toxic

manifestations. Death rate due to toxic effects of Amodiaquine is more than the risk of death due to severe malaria infection. Therefore, Amodiaquine has now been withdrawn from the programme.

3.3. REFERRAL SYSTEM FOR MALARIA UNDER THE PRIMARY HEALTH CARE DELIVERY SYSTEM

a) **A clinical case** of malaria usually presents with rigors, temperature, headache, bodyache, etc.

b) **In children,** depending on the degree of temperature, complications such as convulsions, dehydration and disorientation may arise.

c). **In pregnancy,** malaria specially ***P. falciparum*** is a serious complication because with each bout of malaria, there is a sharp reduction in haemoglobin values and those pregnant women who have anaemia before the onset of disease are likely to develop serious complications because of hypoxia (low oxygen content in the blood) leading to abortions or miscarriages.

Prolonged ***P.falciparum*** infection in pregnant women also leads to low birth weight of the child because sequestration of parasites in placenta restricts oxygen & nutrients flow to the foetus.

d) Most of the serious complications are not encountered in ***P. vivax*** and ***P. malariae*** infections except where due to high pyrexia, infants or young children get disorientation or convulsions.

e) The other serious complications usually arise in ***P.falciparum*** infection. They may sometimes develop suddenly in a short span of time and may lead to mortality, if not treated promptly and adequately.

Therefore, it is essential that the Medical Officer PHC himself and the peripheral staff connected with case detection

and treatment of malaria should remain alert. They should anticipate and cope up with the emergency arising out of malaria infection.

Management of Severe Cases of Malaria requires immediate administration of life saving drugs. Therefore availability of the following is essential :

- Antimalarials which can be given I.V. Quinine and other life saving drugs.
- Intravenous infusion equipment.
- special nursing for patients in coma.
- facilities for blood transfusion.
- well equipped laboratory.
- oxygen respirator.

Many of these items are not available at the PHC level. Under such circumstances, the Medical Officer, PHC and paramedical staff under the guidance of Medical Officer should be able to administer emergency treatment and refer the case without delay to other institutions where such facilities are available. They should develop links with these institutions.

3.3.1. Role of peripheral workers

The community comes in contact with FTD, DDC, Link Worker, and MPW (M & F) as a routine. They depend on these persons for advice and treatment of different diseases, malaria being one of them. Therefore, it is essential that the Medical Officer PHC while training **these category of workers should emphasise the necessity of recognising a serious case of malaria before it is too late.** These workers should be well conversant with the sign & symptoms of malaria and those which are likely to lead to serious complications.

As mentioned above, the general sign & symptoms of malaria are rigor, fever, headache, bodyache and malaise. If the patient comes to any of the most peripheral agencies (FTD, DDC - holder, Link Worker, MPW) at an early stage, they should invariably take :

- history of the case.
- blood smear (except in case of DDC).
- administer proper dosages of antimalarials orally.
- **with instructions that in case the patient does not get relief from symptoms of malaria within a period of reasonable time i.e. 24 hours, and / or headache / fever continues to increase, the patient should report to nearest PHC/CHC/Hospital.**

3.3.2. Criteria for referral to Primary Health Centre

a) Persistence of fever after 48 hours of initial treatment.

b) Continuous vomiting and inability to retain oral drugs.

c) Headache continues to increase.

d) Severe dehydration - dry, parched skin, sunken face.

e) Too weak to walk in the absence of any other obvious reason.

f) Change in sensorium eg. confusion, drowsiness, blurring of vision, photophobia, disorientation.

g) Convulsions or muscle twitchings.

h) Bleeding and clotting disorders.

i) Suspicion of severe anaemia.

j) Jaundice.

k) Hypothermia.

The PHC Medical Officer should be capable of performing a full clinical assessment of the case and ensure that for management of severe and complicated malaria cases, he has the following facilities :

i) Blood smear examination & parasite count possible.

ii) Routine examination of urine & haemoglobin estimation.

1. Intravenous antimalarials i.e. Quinine.

   Oral-Sulfa + Pyrimethamine, Chloroquine.

2. Saline / glucose / dextrose for intravenous transfusion.

3. Oxygen for serious and complicated cases.

4. Antipyretics, Anticonvulsants, diuretics, antibiotics.

He should at the PHC Headquarters have an ANM trained in nursing care of serious malaria case. **However, if any one of these facilities is not available, he should on the basis of the clinical diagnosis** administer in unconscious patients by intravenous/intra muscular route antimalarial and refer the case to a second level of referral facility.

Decision to refer must not be delayed by the PHC Medical Officer

3.3.3. Criteria for referral to District Hospital

a). Cerebral malaria patients not responding to initial treatment with i/v Quinine.

b). Severe anaemia warranting blood transfusion.

c). Bleeding and clotting disorder.

d). Haemoglobinuria.

e). Pulmonary oedema.

f). Cerebral malaria complicating pregnancy.

g). Oliguria not responding after correction of fluid deficit and administration of diuretics.

8. Fluid electrolyte and acid base disturbance.

3.3.4. Care of vulnerable group

In case of pregnant women and those having low haemoglobin percentage (which can be ascertained in the PHC laboratory), who are likely to require immediate blood transfusion, if facilities are not available, such cases should be referred to a higher referral centre where blood transfusion facilities are available. They should not be sent to the CHCs or Taluk Hospital, if blood transfusion facilities are not available there.

The PHC Medical Officer will send the case-sheet along with the patient, will also indicate the antimalarial(s) administered and its dosage and time of administration and report on blood smears & other investigations for guidance to the second referral level.

The patient should be referred to the nearest second referral post to avoid delay in management of the case, because in patient of acute malaria with complications, more serious impairment can develop within a very short span of time i.e. a few hours, if treatment is not given properly and the patient is likely to succumb to malaria infection.

It is, therefore, essential that the PHC Medical Officer should be fully aware of the limitations of facilities available at PHC and should not wait till the last moment to refer the case to higher referral centre. As has already been mentioned above, pregnant women and infants must be referred immediately to referral centre where blood transfusion facilities are available.

3.3.5. Referral Links

The CHC/District Hospital, Taluk Hospital should have a link with the PHC for handling the malaria emergency. As

soon as patient reports to them, they should on the basis of diagnosis by the PHC Medical Officer reassess the condition of the patient, take all measures as indicated for management of serious and complicated malaria.

District Hospital :

Concerned Specialists are Physician, Paediatrician and Gynaecologist.

Essential Facilities :

1. Blood transfusion.
2. Peritoneal Dialysis.
3. Respirator.
4. All laboratory investigations.

There are certain precautions which must be taken :

The drugs which are contra-indicated should not be administered specially if case is being referred to higher referral centre, the drugs are :-

1. Heparin
2. Corticosteroids
3. Mannitol
4. Adrenaline
5. Intramuscular administration of Quinine and Chloroquine are not advisable as most seriously ill patients have circulatory impairment, therefore absorption from the site of injection is erratic and blood concentration of the drug may be delayed. Further at the site of injection, local complications like necrosis, abscess, etc. may occur.

Investigation Report on death due to malaria is given in Annex.-10

4. 'SHORT-TERM' INTERVENTION MEASURES IN 'HIGH RISK' AREAS

Whereas 'early detection and prompt treatment' prevents mortality, the adequate intervention measures for transmission could reduce quantum of morbidity in the community.

It is, therefore, essential to choose carefully proper vector control measures to reduce/interrupt transmission. The type of control measures to be used locally will depend on vector species, its behaviour, environmental, and other socio-economic factors related to the community.

4.1. METHOD OF SELECTION OF VECTOR CONTROL MEASURES

Having selected the 'high risk' areas by the method given at Annex-12, page 159, it is essential that at the district level, the Chief Medical Officer and District Malaria Officer in consultation with State Programme Officer will indicate in the proforma at **Appendix-II (C)**, the type of paradigm of the 'high risk' areas selected for implementation of vector control measures. These areas may belong to any of the following categories :

4.1.1. Tribal Areas

The largest malarious areas with very high malaria incidence and prolonged transmission period inhabited by tribal population lie in the hills and foothills of Himalayas and Southern Peninsula, in seven North-Eastern States and tribal areas of Andhra Pradesh, Bihar, Orissa, Maharashtra, Gujarat, Rajasthan and Madhya Pradesh.

However, in this malaria paradigm, there are extensive local variations due to natural topography and vector species, such as in the **hills/foothills** with **perennial water sources** and **extensive forested areas** of seven North-East-

ern States: The vectors are *An.minimus, An.fluviatilis, An.philippinensis* and *An.dirus* and in the **hills/foothills of Peninsular India (Eastern and Western Ghats)** Andhra Pradesh, Orissa, Bihar : The vectors are *An.culicifacies, An.minimus* and *An.fluviatilis.*

Short-term intervention measures

- Two/three rounds of spray with suitable insecticide in all subcentres qualifying under criteria.

- A selective additional round in the few villages with perennial transmission

Note: Coverage of rooms should not be less than 80% and spray schedule tailored to curtail the local transmission period.

4.1.2. **Epidemic Prone Areas**

These include the States of Punjab, Haryana, Western Uttar Pradesh, Rajasthan, Madhya Pradesh,Gujarat, Maharashtra and a few pockets in other States like Andhra Pradesh, Karnataka and coastal Orissa. However, there are many variations in the topography and other socio-economic features within this vast area and there are many distinct local entities. These sub-paradigms are as under and **the District Officer/PHC Medical Officers should indicate the sub-paradigm of the selected area as given below :-**

a). Plain irrigated area (canal irrigation): Haryana, Punjab, Western Uttar Pradesh, part of Rajasthan, Madhya Pradesh, etc. Vector *An.culicifacies,* sibling species 'A' or 'A' along with 'C' and 'D'.

Short-term intervention measures

- Residual insecticidal spray, two or three rounds of spray with suitable insecticide in subcentres recording high malaria incidence.

- Implement anti-epidemic measures in case of focal outbreak.

b). Irrigated areas: Eastern Uttar Pradesh, North Bihar, part of West Bengal, Hypoendemic areas with negligible transmission potential - Sibling species 'B' of ***An.culicifacies*** present which is not a vector

It is not expected, that in these areas, any PHC/sub-centre will qualify the criterion of **'high risk'** areas but if this happens, the following measures should be undertaken:-

Short-term intervention measures

- Two rounds of spray with DDT 1 gm/sq. metre in selected villages only showing qualified SPR and presence of ***P.falciparum*** infection.

- In villages with qualified SPR but with ***P.vivax*** infection only, one round of DDT spray to cut off peak transmission period.

c). Plain desert areas with periodic high malaria incidence -

Rajasthan (with large water storage tanks for domestic use) - Vectors ***An.stephensi and An.culicifacies :*** in limited pockets.

Short-term intervention measures

- Anti-larval measures with temephos in prescribed dosage in water storage tanks every week.

- Use of biocides in other peridomestic ground water collections which are **not** used for domestic purposes.

- Keep watch on vector density build up

Although in areas where ***An.stephensi*** is the principal vector, anti-larval method as suggested above is the ideal solution but till such time their use is put in practice, two/ three rounds of indoor residual spray with suitable insecticide should continue.

In addition in areas where ***An.culicifacies*** is the principal vector, residual insecticidal spray will remain in practice.

d). Plain coastal areas with moderate epidemic potential - Coastal areas of Orissa, Andhra Pradesh and Tamil Nadu - Vectors ***An.culicifacies,*** sibling species 'A' and 'C' and ***An. annularis.***

Short-term intervention measures

- Focal spray irrespective of transmission period in and around ***P.falciparum*** households or focal spray in and around ***P.vivax*** households during transmission period.

- Two rounds of spray in selected villages with qualified SPR with DDT 1 gm/sq. metre with 80% or above coverage of rooms.

- Implement anti-epidemic measures in case of a focal outbreak.

e). Plain Coastal areas where epidemics unknown - Kerala, other Western Ghats, plains and foothills: Vector ***An.culicifacies,*** Sibling species 'C'.

Short-term intervention measures

- Focal insecticidal spray irrespective of transmission period in and around ***P.falciparum*** households or focal spray in and around ***P.vivax*** households during transmission period.

- One round of insecticidal spray in selected villages with qualified SPR with DDT 1 gm/sq.metre with 80% or above coverage of rooms.

- Implement anti-epidemic measures in case of a focal outbreak.

In these areas regular rounds of insecticidal spray may

not be required.

4.1.3. Project Areas

a). Malaria problem

The project areas are those areas where construction/ developmental activities are taken up and temporary tropical aggregation of labour takes place. As far as minor projects are concerned, where small number of temporary labour is engaged and the labour is recruited from the adjoining localities, no separate arrangements need be made for malaria control except water management at the site of the project and as the labour comes from adjoining population, it can be covered by the staff of the PHC.

However, for intermediate and major projects it is necessary that special organisation will be required for malaria control.

The District Malaria Officer should identify such projects including construction, industrial, irrigation and power plants as well as those which have separate townships and discuss the malaria problem in such projects in the High Power Board meetings.

Through the High Power Board, arrangements can be made for establishing a project malaria control organisation with requisite staff to take up malaria control activities. The funding of such an organisation can be decided by mutual agreement between the project authorities and State health authorities. The project malaria control organisation will send monthly report to the concerned District Malaria Officer and State Programme Officer. A review of activities will be taken up by the High Power Board.

The following steps should be taken for establishing the malaria control organisation :

b). Proposed Staffing Pattern for Projects

The project staffing pattern for malaria control organisation for a project employing 10,000 people may be as follows :

1.	Medical Officer	1
2.	Malaria Engineer	1
3.	Malaria Entomologist	1
4.	Malaria Inspector	1
5.	Superior Field Worker	1
6.	Field Workers (For anti-larval work @ 1 per 2.56 sq.km. of area and for focal spray)	10
7.	Insect Collectors	2
8.	Laboratory Technician	1
9.	Surveillance Workers (@ 1 per 4000 population or part thereof)	3
10.	FTDs (@ 1 per 1000 population or part thereof)	
11.	Spray Staff (for 5 months)	
	a) Superior Field Workers	2
	b) Field Workers	10

If the number of temporary/permanent employees is more, the peripheral staff may be increased proportionately.

Insecticides and larvicides to be supplied by State NMEP and if purchased by Project authorities, the scale of supplies may be calculated as per norms given in this Manual.

- Appropriate contingency money for purchase of ancillary equipment should be provided by the funding authority.

- The plan of operation should be prepared under the technical advice of State Programme Officer and approved by the High Power Board.

c). Job responsibilities of Malaria Engineer

Wherever feasible, he should advise the project authorities in the prevention of mosquitogenic conditions in (i) Planning (ii) Execution and (iii) Maintenance phases of Developmental Project.

He should liaise with concerned officers in preventing/ eliminating mosquitogenic conditions in project area.

He should undertake source reduction of mosquito breeding such as borrow pits, pools, ditches and other stagnant water collections.

He should inspect the water sources for detecting mosquito breeding and undertake engineering methods for control of mosquito breeding.

d). Early Case Detection and Prompt Treatment

(i). All incoming labour employed by the Project authorities as well as the labour and their families imported by the sub-contractors should be screened at the points of entry. For this purpose adequate malaria posts should be established on the main routes of entry to the project area.

(ii). Each malaria post will have one or two Surveillance Workers who will take blood smears from every labourer entering the project area irrespective of age, sex and fever status of the individual.

(iii). Both thick and thin smears will be collected.

(iv). Each person blood-filmed will be given a single dose of MRT with Chloroquine and Primaquine. In case of children, the dosage should be reduced suitably. All precautions will be observed while administering the drugs. **Pregnant women and infants will not be given Primaquine.**

e). Establishment of FTD, ACD and Malaria Clinic

- In each labour camp, one FTD should be opened by choosing a voluntary worker from among the labour force to collect blood smears from the fever cases in the camp. He will administer presumptive treatment according to Drug Policy of NMEP.

- There should be a Surveillance Worker for active case detection to cover all the labour camps of the project, @ one worker for 4000 population or part thereof.

- The active case detection will be at **weekly** interval. The slides from the FTDs will be collected twice a week and sent to the malaria laboratory for examination.

- There should be one supervisor for a group of 4 Surveillance Workers or part thereof.

- The Supervisor will ensure that the FTD and ACD workers regularly cover the labour population for malaria surveillance. He will also give radical treatment to positive cases. He can involve the Surveillance Worker in radical treatment of positive cases, if the number of cases is very high.

The Supervisor and the Surveillance Worker will refer to the hospital, dispensary or Malaria Clinic the seriously sick cases and fever cases with altered sensorium only after preparing blood smear and administering presumptive treatment.

Malaria Clinic with a Laboratory Technician should be established and the functions should be similar to the post

in PHC. As the Clinic will be taking care of malaria exclusively, the slides should be examined within 48 hours with priority to blood slides taken from incoming labour. If the quantum of work is heavy, an additional laboratory technician should be posted.

In case, institutional medical facilities are not available in the project area, a referral hospital should be identified for management of severe and complicated malaria cases.

f). The short-term intervention measures will be:-

(i) Weekly anti-larval measures with chemical larvicides or biocides.

(ii) The bio-environmental measures for water management like drainage, filling and levelling of water bodies should be undertaken, wherever possible.

(iii) The residual insecticidal spray will be carried out with appropriate insecticide to cover the transmission period (two or three rounds of spray) in all buildings and new hutments built during transmission season.

(iv) All labour camps should be covered by regular anti-larval/residual insecticidal spray methods.

(v) The methodology of anti-larval and spray operations, their planning and execution will be similar to that of urban/rural malaria.

(vi) The incoming labour to the forest labour camps should be screened and FTD should be established for early case detection and prompt treatment.

4.2. SELECTION OF SUITABLE INSECTICIDE

The choice of insecticide for areas under the vectorial influence of *An.culicifacies* :-

This species is a vector almost all over India. It is a complex of sibling species - 'A', 'B', 'C' & 'D'. All sibling species are efficient vectors of malaria except sibling species

'B'. A genetic variant of sibling species 'B' transmits malaria only in Rameswaram Island. Sibling species were found to differ in their response to insecticides and also in the rate of development of resistance to different insecticides. Based on these observations, the following recommendations are made for indoor residual spray :-

Species 'A' where predominant	Malathion
Species 'B' and 'C' areas	In most of the areas, these species have already developed resistance to Malathion - Use Pyrethroids

Unless the previous observations are conclusive - Use DDT ensuring total coverage in TIME and SPACE before switching over to Malathion or Pyrethroids.

The other main vectors of malaria i.e. ***An.fluviatilis, An.philippinensis, An.minimus*** and ***An.dirus*** are still susceptible to DDT. However, susceptibility status should be continuously monitored and if the tests show development of resistance coupled with loss of epidemiological impact of spray operations, the following strategy should be adopted for change of insecticide.

Resistant to	Alternative insecticide
DDT	Malathion
DDT and Malathion	Synthetic Pyrethroids

Note: BHC has been used extensively in the public health for disease control programmes and agriculture. By

now the malaria vectors have developed resistance to this insecticide. Govt. of India has decided to phase out BHC by 1997. Therefore, BHC has not been mentioned above as an alternative insecticide.

If the change of insecticide is warranted, the State Govt. should support their choice of alternative insecticide by documented data on vector resistance studies and field observations on epidemiological impact of spray in respect of insecticide in use. The change of insecticide will always be decided in mutual consultation between State Programme Officer for Malaria, ROH & FW and the Directorate of NMEP with concurrence of State and Central Governments.

4.3. CHANGE OF INSECTICIDE

All proposals for change of insecticide should be put up between Jan/March of the year. Any proposal submitted later will delay in implementing such a decision. The time-table for such proposal will be as under:-

a). January-February - State Govt. submits the proposal for change of insecticide. All technical data on vector resistance, epidemiological impact of the current insecticide in use, along with financial outlay, quantity of alternative insecticide chosen, with comparative cost difference for spray operation should be included in the proposal.

b). March/April - Mutual consultation between State Malariologist/Director of Health Services, ROH&FW and Directorate of NMEP. The proposal has to be cleared by the Technical Advisory Committee.

c). April/May - Approval by the Central Government.

d). July/Dec. - Processing of insecticide procurement proposal, placing of orders for next year's spray operations

and fixing of delivery schedule so that insecticide reaches the periphery by Mar/Apr next year. Making adequate budget proposal and obtaining sufficient allocations.

Note: a). All proposals are based on epidemiological data of previous year(s) i.e. if proposal is submitted in January/February **1996,** epidemiological data of **1994** or **1995** are used.

b). The change of insecticide will then be effective during spray operations of **1997.**

c). **If the proposals are submitted later than January/February, the change for insecticide will be postponed by another year.**

4.4. INSECTICIDAL SPRAY OPERATIONS

The insecticidal spray of human dwellings is as important for malaria control in the community as is the early case detection and prompt treatment for an individual cure.

Therefore, it is essential that residual insecticidal spray should be planned and implemented with sound technical skill and under expert guidance. It should not be entrusted to non-technical personnel like contractors, voluntary bodies, etc.

In the revised approach to malaria control, it has been decided to spray human dwellings and mixed dwellings. **Cattle sheds are *not* to be sprayed** with a view to conserve insecticide, improve house coverage and divert the mosquitoes from human dwellings to cattle sheds.

4.5. PLANNING OF SPRAY OPERATIONS

The planning of spray operations will be done by **District Malaria Officer.** He will involve the Medical Officer incharge of the PHC in this process. The epidemiological

data are processed in the following manner during planning of spray operations :

Under the MPO, the spray operations are to be carried out in all areas with API 2 or above. However, the priority of spray will be given to 'High Risk' areas all over the country by the State Governments.

Therefore,

In **'High Risk'** areas the population of 'subcentres' qualifying under the criteria laid down by the Expert Committee is considered. This population is obtained from proforma at **Appendix-I** and consolidated for the district in **Appendix-II (C)**

and

In **Subcentres** with API 2 and above, (excluding the high risk subcentres) population of qualifying subcentres only (to be considered for spray in a PHC/District) in all the districts is segregated in the **Appendix-II(D).**

While planning for spray, the epidemiological data of preceding three years are considered for selecting the population to be protected.

4.6. REQUIREMENT OF INSECTICIDES

Having selected the population for spray, the insecticide requirement is calculated as under:-

The insecticide requirements are given @ per million population, per annum. For smaller population, calculate proportionately.

a). DDT 50% wp @ **150** MT (per million population) for two rounds of spray

In areas where third/special round is proposed in **selected villages,** give additional requirement @ **75** MT per million for population of those villages only.

b). Malathion 25% wp @ **900** MT (per million population) for three rounds of spray

If in some areas a further round is required in selected villages, calculate @ **300** MT per million for the special round for the population of **selected villages only.**

c). Synthetic Pyrethroids

i). **Deltamethrin** 2.5% wp @ **60** MT (per million population) for two rounds of spray.

In areas where third/special round is proposed in **selected villages,** give additional requirement @ **30** MT per million for the population of selected villages only.

ii). **Cyfluthrin** 10% wp @ **18.75** MT (per million population) for two rounds of spray. (Special round @ **9.38** MT as above)

iii). **Lambdacyhalothrin** 10% wp @ **18.75** MT (per million pop.) for two rounds of spray. (Special round @ **9.38** MT as above)

The insecticide formulations & dosages are given at Annex-1, page 113.

4.7. SAFE HANDLING AND STORAGE OF INSECTICIDES

4.7.1. Precautions for handling of Insecticides

a). While making suspension - use rubber gloves so that skin of hands does not come in direct contact with insecticide.

b). The cholinesterase level of all spray men employed in spraying of MALATHION or the other organophosphorus compounds should be monitored regularly at the recommended intervals and those showing a drop in cholinesterase level to 62.5% and below should be withdrawn and given rest and if needed, medical aid. For estimation of cholinesterase level, standard technique recommended by WHO should be used.

c). Avoid contamination of cooked food or food material.

d). Smoking, drinking or eating should not be done while handling the insecticide, if needed such things should be done only after thoroughly washing hands and face.

4.7.2. Additional Precautions for handling of Organophosphorus Compounds and Synthetic Pyrethroids

a). While spraying organophosphorus compounds and synthetic pyrethroids, use protective clothing.

b). The exposed skin, hands, face and eyes should not come in direct contact with insecticide.

c). In case of accidental contamination, wash liberally with soap and water.

4.7.3. Storage of Insecticides

a). The FTDs or Voluntary Link Workers in their headquarters villages should be selected and they are made responsible for safe storage of insecticide.

b). Select and earmark insecticide dumping stations well in advance in each PHC, keeping in mind the communication facilities during rainy season.

c). Indicate the quantity of insecticide to be stored in each dumping station.

d). Fix the date by which the insecticide will be placed in the dumping station.

e). Ensure proper safety of insecticide at the dumping station and also take steps to prevent any health or environmental hazard due to insecticide while stored at the dumping station.

f). Make sure that full quantity of insecticide required for all rounds of spray (2 or 3 rounds as the case may be) is transported to the dumping stations with adequate safety precautions.

g). Store the insecticides away from food, foodstuffs, children and animals. Keep the insecticides preferably in enclosed and locked location.

h). Store insecticide in a dry place on raised platform and store room with provision of ventilation.

i). The stacking of bags or boxes etc. should be done as per the standard procedure of stacking not more than 10 bags of 50 kg. each one over the other and in a manner that first stocked to be taken out first for use, so that the insecticide is used before the expiry date.

j). The insecticide should not be exposed to sunlight and high temperature either in the storage or at dumping place.

k). Ensure that the containers are properly labelled.

l). A mark of caution like "Poison", "Danger, Keep away", should be placed at the store room with symbols whichever is applicable.

m). Empty containers should be destroyed so that they are not used for storing food materials or for other household purposes.

The records are kept in the following proformae:-

Register-Record of Insecticide Dumping Stations

Name of PHC_____

Name of Insecticide_____ Name of Village_____

Date of storage/ issue	Name and address	Quantity of insecticide		Signature of Householder	Quantity of insecticide issued	
		Bags	Kgs		Bags	Kgs
1	2	3	4	5	6	7

Balance		Signature		Remarks
Bags	Kgs	House-holder	Malaria Worker	
8	9	10	11	12

* One register for each PHC

* Whenever insecticide is taken out for spray, enter date in col. 1, quantity issued in col. 6 & 7 and balance in col. 8 & 9.

4.8. ADVANCE SPRAY PROGRAMME

The DMO should prepare the advance spray programme for each round of spray, showing date of spray, population, no. of houses and rooms to be sprayed, quantity of insecticide required and number of spray squads to be deployed. This should be a village-wise/hamlet-wise detailed programme.

Sample Proforma for Advance Spray Programme

Advance Insecticide spraying programme

Name of District_____Name of PHC & Population_____

Area under Spray during _____ Round of spray 19_____

1. No. of Subcentres_____

2. Number of Villages_____

3. Number of Hamlets_____

Scheduled date of commencement_____ Scheduled date of completion_____

Scheduled date of spray	Name of the village/ Hamlet	Total no. to be sprayed			Insecticide (specify) required in Kgs.
		Human dwellings	Mixed dwellings	Rooms in HD & MD	
1	2	3	4	5	6

Spray squads allotted	Remarks
7	8

i). Number of spray round — indicate whether the programme is for I, II, III or special round.

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ii). Only the total number of subcentres selected for spray coverage should be given.

iii). Only the total number of villages/hamlets selected for spray coverage should be given.

iv). Indicate the name of insecticide in col. 6 i.e. DDT 50% wp, Malathion 25% wp, Deltamethrin 2.5% wp, Cyfluthrin 10% wp, Lambdacyhalothrin 10% wp along with quantity required.

Quantity required for spraying a house of 150 sq. metres is given below:-

DDT 50% wp **300** gms., Malathion 25% wp **1200** gms, Deltamethrin 2.5% wp **120** gms., Cyfluthrin 10% wp **37.5** gms., Lambdacyhalothrin 10% wp **37.5** gms.

Sufficient copies of advance spray programme are made and given to :

1. State Malariologist, 2. Zonal Officer, 3. District Collector/District Development Officer, 4. Chief Medical Officer of the District, 5. Block Development Officer, 6. PHC Medical Officer, 7. MPW (Male), 8.Gram Panchayat

a). Fix responsibility for spray supervision on the staff under the Primary Health Care System. The MPW (Male) will supervise spray in his area.

b). Other supervisory cadre namely DMO/AMO/MI/ MO PHC and Health Supervisors are allocated different areas on different days.

c). DMO/MO PHC should have one copy of the advance spray programme for concurrent and consecutive supervision.

d). Having made the advance spray programme, the DMO will work out requirement of seasonal spray staff.

4.9. SEASONAL SPRAY STAFF

The Expert Committee on Malaria - 1995 has recommended 260 workers i.e. 52 squads for five months spray period to cover one million population.

a). Each spray squad can cover 60-80 houses a day (i.e. 30 to 40 houses per pump).

b). In hills/foothills a squad can cover 50 to 60 houses per day (i.e. 25 to 30 houses per pump).

c). Each spray squad comprises of:-

i). Five Field Workers (unskilled)

One pump man, one spray man for each stirrup pump and one for bringing water to prepare suspension for two pumps.

ii). One Superior Field Worker (Supervisor - skilled labourer) He will supervise the spray and keep records.

4.10. SUPERIOR FIELD WORKER'S DIARY OF INSECTICIDE SPRAY

Spray squad number :___ Name of the Superior Field Worker:___

Actual date of spray : _____Name of Insecticide used :_____

Name of the Village/Hamlet_____

S.No.	House No.	Name of the Head of Family	House			No. of Rooms	
			Sprayed	Not sprayed/Missed		Targeted	Sprayed
				Locked	Refused		
1	2	3	4	5	6	7	8

Insecticide consumed	Remarks	Signature of SFW
9*	10	11

Daily Summary of Spray

1. No. of houses targeted : ____ 2. No. of houses sprayed :____ 3. No. of houses missed-locked/refused : __ 4. No. of rooms targeted :___ 5. No. of rooms sprayed :___ 6. No. of rooms missed : _____ 7. Total No. of buckets of suspension made : _____ 8. No. of buckets consumed : _____ *9. Insecticide consumed in kg.: _____

Signature of SFW **Signature of Supervisor MPW (Male)**

In col no. 9 — put a tick mark (✓) when a new bucket of insecticide is started.

4.11. EQUIPMENT FOR ONE SPRAY SQUAD

Item	Quantity
Stirrup pumps	Two
Spare nozzle tips for spray pump	One
Bucket 15 lit.	Four
Bucket 5/10 lit.	One
Asbestos thread	Three metres
Pump washers	Two
Measuring mug	One
Straining cloth	One metre
Plastic sheet (3 X 3 mtr.)	One
Soap	One

The MPW (Male) or Supervisor of the camp should have extra spray pumps, nozzle tips, washers, asbestos threads, wire and a set of tools for minor repair of pumps. It should contain a pipe wrench, pliers, screw drivers and a set of spanners. The pump repair tool set should be with squad supervisor.

4.12. SUPERVISION OF INSECTICIDAL SPRAY OPERATIONS

The nozzle tip, preferably of stainless-steel, should be flat fan type and the discharge rate should be between 740 cc and 850 cc per minute. The nozzle tip should be discarded if the discharge rate exceeds 850 cc per minute. It takes about 5 minutes to spray a house with an average sprayable surface area of 150 sq. metres. The spray lance should be kept 45 cm away from the wall surface and the swaths should be parallel overlapping one third of area of the preceding swath. To obtain the above discharge rate, the pump man shall give 20 to 26 strokes per minute with 10 to 15 cms plunger movement at a pressure of 10 P.S.I. at the nozzle tip. The spray nozzle is not to be turned against wind direction as this may bring insecticide droplets on spray man.

4.12.1. Role of Multipurpose Worker (Male)

a). Each MPW (Male) supervisor can effectively supervise the work of 2 to 4 squads.

b). Each MPW (Male) supervisor should deploy the squads (two pumps) in such a way that each squad works in a house at a time and all the squads under his supervision work in adjacent houses for convenience of supervision.

c). Each MPW (Male) will make an abstract of spray output showing insecticide consumed, squads utilised, human dwellings sprayed, missed, locked, refused and rooms sprayed/rooms missed in the proforma prescribed.

d). MPW (Male) will ensure the quality of spray in the human dwellings.

The spray should be uniform.

The deposit should be in small discrete droplets and

not splashes.

e). All sprayable surfaces - like walls, ceilings and eaves should be covered.

f). If the ceiling is thatched, it should be sprayed so as to cover both sides of rafters/bamboos, if necessary the ceiling should have two coats each starting from opposite direction.

g). All false ceilings and attics should be sprayed.

h). If houses are built on stilts/platforms, the under surface of platform should also be covered.

i). The supervisor will put a stencil on the wall of the house indicating spray status of the human dwelling (All rooms and varandahs are counted).

j). He ensures that spray men use protective clothing and wash the spray equipment daily.

k). The washing of the equipment, etc. should not pollute local drinking water source or water used for cattle.

l). The spray men should wash the exposed surface of their body with soap and water.

m). He will ensure that all precautions are taken by spray men to avoid contamination of food material or cooked food or drinking water in the house. These can be protected by covering with a plastic sheet. Similarly fodder for animals should be protected.

n). Advance spray information to community/villages

The MPW (Male), himself and through DDCs/ FTDs and Voluntary Link Workers should give Advance Spray Information to Villagers.

4.12.2. Role of Voluntary Link Workers & FTDs

a). The Link workers/FTDs will help in motivating the local population for accepting spray coverage.

b). They will give advance spray information to all villagers of their village at least fifteen days in advance.

c). They will again inform villagers and opinion leaders three days in advance.

d). They will conduct a meeting of the villagers with the help of opinion leaders about advantages of getting human dwellings sprayed and precautions to be taken to prevent accidents connected with insecticidal spray and also their effect on environmental pollution.

4.12.3. **Role of Malaria Inspector**

a). Malaria Inspector will be under the technical and administrative supervision of District Malaria Officer. District Malaria Officer will allocate PHCs for each Malaria Inspector for supervision & implementation of malaria control activities in the PHCs in his jurisdiction.

b). Like Assistant Malaria Officer, the Malaria Inspector will be primarily concerned with planning/supervision and conducting of insecticidal spray operations and anti-larval operations under the guidance of District Malaria Officer in the PHCs allocated to him.

c). He will be on tour for 15 to 20 days in a month for field supervision. He will be responsible for supervision of spray operations and carry out the work as assigned by the District Malaria Officer/Assistant Malaria Officer.

d). He will ensure that the field staff i.e. Superior Field Workers, MPWs and incharge of the local spray camp carry out all the work as assigned for these categories of staff.

e). Subcentre-wise details of positive cases and remedial measures specially focal spray, mass and contact survey - MF-7.

f). Spray data records and monthly submission of reports (MF-6) and epidemiological investigations and send a

copy of MF-6 to the Director, NMEP for computerised compilation.

g). He will maintain stock registers of insecticides and larvicides received for his area.

h). If community therapeutic measures are undertaken or epidemic containment is done, he will assist in record maintenance and reporting.

i). He will organise RT in his area to ensure prompt treatment of cases.

j). He will be responsible for complete coverage and quality of insecticidal spray.

k). In specific situation, he will be responsible for timely and proper anti-larval operations.

l). He will train the seasonal spray staff in correct technique of suspension preparation and insecticide spray for a period of two days.

4.12.4. **Role of Health Supervisor**

a). The PHC Health Supervisor will help in organising and supervision of the spray operations in his area, wherever required.

b). He will ensure that the MPW (Male) gives advance infomation on spray to the villagers

c). In case of refusal, he will motivate the householders for accepting the spray

d). He will ensure the quality of spray operations and keep record of insecticide consumption

4.12.5. **Role of Medical Officer**

a). PHC Medical Officer will ensure that the spray operations are conducted as per schedule and in case of any delay, he will find out the reasons and reschedule the programme.

b). He will solve any bottlenecks in spray operations in his area such as turnover of seasonal spray men (field workers), insecticide supplies, shifting of camps, etc.

c). He will see that reports are sent in time.

d). He will contact DMO immediately in case of delay/suspension of spray programme and solve the problems.

e). He will, during field visits, inspect spray operations at least once a week.

4.12.6. **Role of Assistant Malaria Officer**

a). The Assistant Malaria Officer will work under the technical control of District Malaria Officer.

b). He will assist in chalking out fortnightly domiciliary visits of MPWs.

c). He will help in selection of FTD/DDC/Voluntary Link Workers.

d). He will help in working out insecticide requirements, their dumping programme and other aspects of logistics.

e). He will help in organisation and supervision of spray operations.

f). During field visits he will carry out consecutive and concurrent supervision of both case detection and spray operations.

g). He will help in preparation of reports and returns and ensure that these are sent regularly.

h). He will help District Malaria Officer in all other technical and administrative functions connected with malaria control in the district.

4.12.7. **Role of District Malaria Officer**

a). Apart from making arrangement for spray, the

DMO will provide the technical supervision and guidance to spray operations in the district. He will be responsible that the spray coverage is achieved in time and space in all areas projected for spray in his district.

b). He will inform the State Programme Officer, ROH&FW & Dte. of NMEP about the commencement of spray operations.

c). He will see at least 5 to 10 villages every week to check the quality of spray.

d). He will make arrangements for transport of insecticide to field (dumping stations) well in time.

e). He will ensure that all spray equipments along with spare parts are purchased/repaired in time well before commencement of spray operations.

f). He will ensure that sufficient budget is available and spray men get their payment in time.

g). He will cover all PHCs of the district during spray inspection/supervision in each month.

h). He will submit the spray completion reports within fifteen days of the completion of the respective rounds.

4.13. MOBILE EPIDEMIC CONTROL UNIT

One of the essential requirements is to have a quick response capability for control of epidemics. This capability should be created at peripheral administrative headquarters i.e. district level. Therefore, the Expert Committee has recommended that the State Govt. should establish one mobile unit for epidemic control in each district falling under high risk category. The unit should be fully equipped to investigate and undertake quick containment measures. Therefore, it is recommended that in the problem districts, there should be one Mobile Malaria Epidemic Control Unit with

the following components given in the table.

The duties of the Medical Officer incharge of the Mobile Epidemic Control Unit will be to monitor the malaria incidence in different PHC areas of the district. He will take suitable steps for control of epidemics in the district as per guidelines at pages from 98 to 112.

The role of other staff will be same as for the similar category of staff in PHC.

The Mobile Malaria Control Unit at the district level will have the following components:-

Equipment	Staff
i. Vehicle (Van) - 1	i. Medical Officer -1
ii. Microscopes - 2	ii. Technicians -2
iii. H.C.Sprayers - 5	iii. Spray men -5
iv. Hand operated micro-discharge fogging machine - 1 or Atomizers (Flit pump) - 5	iv. Insect Collectors -2
	v. Driver -1
v. Insecticides - as required	
vi. Chemicals - as required	
drugs "	
glassware "	
& others "	

4.14. FUNCTIONS OF THE ZONAL TIER:

Functions of the Zonal Tier are:

To assess the situation of malaria in various districts and PHCs under the jurisdiction of Zone and to guide various districts on the basis of epidemiological investigations

for taking appropriate measures. Such investigations are for validation of:-

i). Villages recording deaths due to malaria.

ii). Villages with the highest positive incidence.

iii). In the absence of examination of slides, the villages wherefrom the largest blood slide collection is being made by the active agency.

iv). To guide MO PHC/DMO in planning of the spray schedule based on the epidemiological parameters of the preceding year(s) well in advance.

v). To suggest appropriate measures in projects so that sufficient funds are provided for antimalarial measures by the project authorities.

vi). The entomological work to be carried out priority-wise will be as follows:

a). Susceptibility status of the vector in malarious areas falling under the qualifying parameters in hardcore, epidemic prone and project areas, as well as other areas of epidemiological importance.

b). Susceptibility status in other areas.

c). Short-term result oriented studies in areas of double resistance or where refractory, for taking up anti-larval measures in a selective way.

d). The evaluation after usual rounds of spray regarding entomological work.

vii). Supervision of the Urban Malaria Scheme.

viii). To keep the headquarters organisation at the State level informed on all malaria problems in the districts under his supervision based on the reports of the District Malaria Officer or on the basis of his own field observations.

ix). To review the monthly reports of each District Malaria Officer and offer his comments to the concerned.

x). To review the tour diary of PHC Medical Officer and the District Malaria Officer and offer his comments.

4.15. ROLE OF ZONAL ENTOMOLOGICAL TEAMS

The guidelines for carrying out entomological work were circulated to all the zones from time to time from the Directorate of NMEP. The calendar of activities by the Entomological zones for the year should be drawn in December of the previous year and sent to the State Health Directorate with copies marked to Regional Office for Health and F.W. and Directorate of NMEP.

4.15.1. Visits by Entomological Teams and Frequency

All the districts under the Entomological Zones should be visited by the zonal team at regular intervals throughout the year.

i) In the Entomological zones which have two districts as jurisdiction, the visits should be made regularly in all the months selecting two PHCs in each district

ii) (a). In the zones which have four districts as jurisdiction, the visits will have to be made in alternate months to each district as mentioned below:-

First & second districts : The visits are to be made in the months of January, March, May, July, September and November.

Third & fourth districts : The visits are to be in the months of February, April, June,August, October and December.

ii) (b). **The zones having three districts,** the most problematic district will be considered as a single unit for monthly visits while each of the other two districts will

be visited in alternate months and two PHCs in each district will be visited.

iii) (a). **In zones having six districts,** the visits will be at quarterly intervals as follows :

First and second districts : January, April, July and October

Third and fourth districts : February, May, August and November

Fifth and sixth districts : March, June, September and December

iii) (b). **The zones having five districts,** the most problematic district, which may be one of the "**high risk**"areas, will be considered as the unit where 4 PHCs each with high SPR will be selected for monitoring the data at quarterly interval and in the other four districts two PHCs each will be selected. The zones which have more than six districts, only one PHC will be selected in such districts.

The entomological teams will be visiting 4 PHCs every month irrespective of the number of districts in their jurisdiction. The visits may be made to cover two PHCs during the first fortnight and the remaining two PHCs during the second fortnight.

4.15.2. **Time to be Spent in Each PHC**

A minimum of three to four days will have to be spent in each PHC.

4.15.3. **Selection of Index Villages and Duration of Monitoring of Data**

The selection of PHCs as well as index villages will be based on:-

i) High incidence of malaria with predominance of *P.falciparum* infection, wherever prevalent

ii) Vulnerability to epidemics and

iii) High vector density

When once the index villages are selected, monitoring of entomological data will have to be continued for a minimum of three years but not exceeding five years. After collecting the stipulated data during the said period, the monitoring of data will be done from other problem PHCs. The zones which have been collecting data from a particular PHC for five years or more, should change the PHC.

4.15.4. **Entomological Parameters to be Collected**

i). Vector Density

Per man hour densities of mosquitoes by aspirator tube and flash light method will be monitored by spending 2 to 3 hours by two Insect Collectors in the morning hours. This should be done in all index villages.

ii). Pyrethrum Spray Collection (PSC)

Whenever mosquito densities are low or more mosquitoes are required, this method may also be used as supplementary to hand collection method. Blood meal sample for precipitin test may also be collected with this method.

iii). Whole Night Collection

The human bait collection from 6.00 p.m. to 6.00 a.m. may be done in one of the index villages in a district. This information should be collected positively during transmission season and at least once during every quarter on indoor as well as on outdoor human baits. Animal bait collection may be done simultaneously with the human bait once during transmission season and second time during non-transmission season. Hourly collection will be separately recorded for the entire 12 hours as per the Proforma-7 at Appendix-V(G).

iv). Recording of Abdominal Condition and Dissection of Mosquitoes

All the female specimens of vectors and suspected vectors will be dissected for oocysts and sporozoites after classifying the abdominal condition. The dissection of mosquitoes of whole night human bait collection is separately indicated in the proforma. A good proportion (not less than 200 females) will also be examined for parity rate during a month.

v). Susceptibility Test

a) Adult Test

The susceptibility status of all vectors and suspected vectors should be determined at least once a year in all the districts. Priority should be given to those districts where no information has been collected during the preceding five years. The tests should be done with the diagnostic doses of DDT, DL and Mal. Whenever sufficient number of mosquitoes are collected, information for LT 50 values may also be collected by changing the time of exposure.

In districts where the vector has been found to be resistant to DDT, DL and Mal, test with Synthetic Pyrethroids may also be conducted. The impregnated papers of diagnostic doses will be supplied by the Directorate of NMEP to entomological zones on request after procuring the same from WHO.

b) Larval Test

The larval susceptibility tests are conducted once a year in every district where larvicides/biocides are in use. If the test kit is not available in any entomological zone, the kit can be shared between the neighbouring zones till such a time that a new kit is made available. **The susceptibility tests shall be conducted on priority in the urban areas**

where organophosphorus compounds such as temephos and fenthion are being used as larvicides.

vi) Contact Bio-assay

This test should be conducted during spray season at two weekly intervals to determine the residual efficacy of the adulticide. The zones which are not in possession of these kits (WHO) may indicate the same to the Directorate of NMEP and the kits will be supplied after procuring the same from WHO, along with other kits.

vii) Aerial Bio-assay

This test is conducted to determine the fumigant efficacy of insecticides, especially of o.p. compounds. The tests may be conducted at two weekly intervals following insecticidal spray.

4.15.5. **Submission of Reports**

The monthly technical (entomological) reports should be submitted in 12 proformae every month (Form-I to Form-11 at Appendix-V). The reports should be sent by 10th of every succeeding month to the State Health Directorate, ROH&FW and Directorate of NMEP, Delhi.

The Annual Entomological Report may be sent by Feb. of succeeding year.

The map of the zone showing the district and PHC boundaries, index villages and separate maps indicating the susceptibility status of different vectors should be sent along with the Annual Report.

The susceptibility status may be marked in each district map as shown in the following table :

Corrected Mortality	DDT	DL	MAL
0 - 24.4%	A^1	B^1	C^1
24.5%- 49.4%	A^2	B^2	C^2
49.5%- 79.4%	A^3	B^3	C^3
79.5%- 97.4%	A^4	B^4	C^4
97.5%- 100%	A^5	B^5	C^5

For other insecticides the alphabet and super-script be on the same lines as above (i.e D, E, F ... etc).

Separate maps may be drawn for different vectors.

4.15.6. **Facilities for Entomological Team**

The Entomological zones should be provided with **independent vehicle** for monitoring entomological data in different districts. Wherever such independent vehicle is not provided, the Zonal Malaria Officer may spare his vehicle to the Entomological Team for monitoring the data.

In no case, insecticide should be transported in the vehicle which is being used by Entomological Team simultaneously.

5. MODIFIED PLAN OF OPERATION

5.1 Based on the recommendations of the Consultative Committee of Experts, a Modified Plan of Operation was launched in the year 1977.

The objectives of the Modified Plan of Operation were :

(i) prevention of deaths due to malaria ;

(ii) reduction of morbidity due to malaria ;

(iii) maintenance of industrial and green revolution and retention of the achievements gained.

Towards achieving this objective, a three-pronged attack was launched.

(i) Government's efforts - spray and surveillance operations through Government Organisation.

(ii) Public participation through voluntary agencies for collection of blood smear and drug distribution, co-operation in spray operations, reporting of any outbreak of fever to local authorities.

(iii) Intensifying research studies on malaria under NMEP with the help of the Indian Council of Medical Research (ICMR) on field operations and by initiating fundamental research in Institutes like the National Institure of Communicable Diseases, Central Drug Research Institute and Malaria Research Centre through Indian Council of Medical Research on some of the areas identified.

Changes in the technical and organizational policies under the Modified Plan of Operation and differences between the concept of malaria eradication programme and the Modified Plan of Operation are given in the organisational chart and in table on pages 74 - 76.

5.2 Organisational

5.2.1 Territorial Readjustments

- Unit boundaries made co-terminus with the district boundaries.

- Sections readjusted so that their boundaries lie within the PHC territory.

5.2.2. A. Administrative

- At State level, the State Malariologist still remains responsible for implementation/supervision and guidance of the programme.

- At Divisional level, Zonal officers have technical/administrative responsibility of programme in their areas under overall

supvervision of Senior Divisional officers.

- At District level, the CMO/DHO has overall responsibility of the programme.

- To assist him, District Malaria Officer is provided.

- Laboratories have been decentralised to PHCs.

- At PHC level, one of the Medical Officers has overall responsibility for surveillance & laboratory services. He also supervises the spray.

- Spray operations are the direct responsibility of DMO in the entire district under overall supvervision of DHO. To assist him there are AUO and MI.

- Within overall pattern, State has been given flexibility in deployment of staff with concurrence of ROH & FW.

5.2.2. B. Technical

- Phasing of the programme is abolished.
- Areas with 2 API and above receive regular rounds of spray.
- Areas below 2 API - only focal spray is done.
- Surveillance is supplemented with FTDs and DDCs at the rate of one FTD/DDC per thousand population specially in inaccessible areas.

- Rational drug policy is adopted suitable to the need of the area in places where drug resistance is found.

- Suitable fundamental field research is instituted with the help of I.C.M.R. in areas where such need exists.

- Health education has been introduced in the programme.

5.2.2.C. Logistics

- Supply pattern of insecticide was rationalised on the basis of population to be protected.

- Spray staff provided on the basis of population to be protected.

- Purchase of insecticide - BHC and Malathion, decentralised to States.

- Equipment purchases decentralised to States.

It was also envisaged that the administration of radical treatment to positive cases under ACD and PCD should be the responsibility of the Medical Officer of the PHC besides the conduct of the case detection activities.

Thus it would appear that the emphasis was, as the Modified Plan of Operation stipulated, that the overall responsibility rests with the Chief of the District Health Organisation and the Medical Officer of the PHC is to be involved as much as possible. Because of specialised activities under antimalaria programme and the level of supervision required, the peripheral staff was strengthened at district and PHC level. The planning at the national level and the technical guidance and supervision at the State level were retained as before.

Simultaneously, with the introduction of Modified Plan of Operation, greater emphasis was laid on development of Primary Health Care System as a part of the National Health Policy. Under this scheme, Multipurpose Worker Scheme (MPW Scheme) and Village Health Guide Scheme were introduced. Some important changes in the implementation of NMEP activities at the peripheral level due to introduction of Multipurpose Worker Scheme are :

(a) The peripheral activities under the epidemiological surveillance in NMEP were on a vertical pattern through unipurpose peripheral worker later on decentralised at PHC level from 1977 under the Modified Plan of Operation.

Under the MPW Scheme, it was integrated at the peripheral level and also at the supervisory level. As domiciliary

services were through staff drawn from different disciplines - Malaria, Family Planning, Smallpox and others, it was observed that the workers drawn from other disciplines did not take as keen an interest in malaria surveillance as shown by erstwhile surveillance workers.

b). Under, NMEP, a malaria section covered a population of 10,000. The ambit of sections was reduced to 5000 population (3000 for tribal areas) under the MPW Scheme.

c). Domiciliary visits continue on fortnightly basis.

d). The planning, implementation and assessment of spray programme is the responsibility of the Malaria Officer at the District level, although PHC Medical Officer and MPW Scheme Staff are also involved.

With the implementation of the Multipurpose Worker Scheme, it was observed that during the transition phase, there was initial decline in the ABER in almot all districts, which gradually picked up with the stabilisation of services.

However, due to lack of supervision and priority given to other programmes, specially Family Welfare, collection of blood smears through the ACD under malaria, showed a declining trend.

The spraying activities being a specialised task, in areas with 2 API and above, the operations are retained as a vertical programme under the direct supervision of the District Malaria Officer.

Table - Differences between Malaria Eradication Programme and Modified Plan of Operation

	Eradication	Modified Plan of Operation
Objective	The ending of the transmission and the elimination of reservoir of infective cases in campaign limited in time	To reduce or keep under control morbidity of malaria, to prevent mortality and to prevent adverse effect on socio-economic development.
Area of operation	Must cover all the area	Must cover all the area
Minimum standard	Perfect	Very good/perfect
Duration of operations	Time limited	Without time limit
Spray operations	During attack phase	No phasing , spraying in selected areas having API 2 and above
Case Finding	Paramount importance in all areas	Paramount importance in all areas
Species classification	Necessary	Very important to implement the measure of chemotherapy and spray in areas of *P. falciparum*

	Eradication	Modified Plan of Operation
Age distribution	Not necessary	Important ; children and infants receiving priority treatment
Epidemiological investigation of positive cases	Necessary in late stages	Not necessary but epidemiological investigations of foci essential
Technical approach to programme	Flexible within the pattern	Highly flexible within financial resources and on epidemiological basis
Imported cases	Important and dangerous in late stages after withdrawal of spray	Do not deserve particular attention except in special circumstances such as tropical aggregation of labour
Epidemiological evaluation of results	Proof of disappearance of indigenous new malaria cases.	By comparing the ABER/API/SPR of three successive years
Entomological studies	Necessary to ascertain vector behaviour	Of paramount importance to assess required change in technical approach

	Eradication	Modified Plan of Operation
Total coverage	Important both for spraying and case finding	Important both for spraying and case finding
Financial commitments and planning	For the entire programme	Flexible from year to year on the basis of epidemiological need and availability of funds
Administration of the programme	Must be fully efficient and speedy, if not, danger of failure.	Must be efficient, flexible to meet emergencies.

Note : Sometimes infant parasite survey could give valuable information.

6. RESPONSIBILITIES OF REGIONAL OFFICES FOR HEALTH AND FAMILY WELFARE, GOVERNMENT OF INDIA

a). The Officers of the ROH&FW should be totally involved in the selection of 'high risk' areas as per the revised strategy. The State Malariologist before sending the proposal to the Dte. of NMEP will discuss the entire proposal with the Regional Health and Family Welfare Office and send a copy of their remarks along with the proposal.

b). The Regional Office for Health and Family Welfare will also ensure that the 'high risk' areas selected by the State do fulfill the criteria laid down by the Expert Committee. The ROH & FW will further ensure that the

short-term containment measures for early case detection and implementation of intervention measures are carried out according to the plan of action given for each type of epidemiological paradigm in the 'high risk' areas so selected.

c). Regional Director, ROH&FW will provide technical guidance and support to State Govt. in the inspection of field operations to ensure high quality.

d). He will through its entomological component carry out field studies and provide support to the State, wherever necessary.

e). He will analyse State/District/PHC epidemiological data, monitor it for epidemic potential and liaise with State in other matters.

f). In case of an epidemic, he will ensure that containment measures are taken in time.

g). The laboratory at ROH&FW will cross-check blood smears both positive and negative as prescribed.

h). The ROH&FW Office will participate and conduct training courses for different echelons of State malaria organisation. The training needs for MAP are given in Annex-9.

7. URBAN MALARIA

7.1. STRENGTHENING OF MALARIA CONTROL MEASURES

The Expert Committee has identified 15 major cities including 4 Metropolitan cities and 14 other towns in the country where malaria situation is serious. Some of the major/metropolitan cities contribute very high number of malaria cases. For example, Madras City contributed 50-70% of total malaria cases in Tamil Nadu during different years.

7.2. IDENTIFICATION OF HIGH RISK URBAN AREAS

The high risk Urban Areas identified by the Expert Committee are as follow:-

7.2.1. All 15 Cities identified as high risk areas by the Expert Committee (Vide Table on page 79).

7.2.2. Among the remaining cities/towns presently covered under UMS, the SPR 10% and above during any of the last three years. The Expert Committee further identified 14 cities/ towns under this criteria (Vide Table on page 80)

7.2.3. Any other urban area with a population of 50,000 or more and SPR more than 5% or the ratio of clinical malaria cases to fever cases more than one third as per hospital/dispensary statistics during the last calendar year.

7.3 ACTION RECOMMENDED BY THE EXPERT COMMITTEE

The Committee has recommended that case detection mechanism should be introduced in urban areas with immediate effect. This recommendation has been made in view of the fact that other agencies like hospitals, dispensaries and clinics do not report clinical malaria cases to the Urban Malaria Organisation. They also rarely get their clinical diagnosis confirmed by microscopy. Therefore, there is under-reporting of malaria cases from urban areas. Further a large number of towns in the country are not included in Urban Malaria Scheme.

In view of the above, it has been decided that:

(i) active case detection organisation should be established for fortnightly domiciliary visit in the slum areas.

(ii) for passive case detection in the hospitals and dispensaries, the strengthening to be done by a component of malaria post by providing a worker to collect blood smears from fever cases in OPD.

CITIES REQUIRING ACCELERATED URBAN MALARIA SCHEME

Sl.No.	Name of the Town	Population (in lakhs)
1.	Delhi	85.00
2.	Madras	39.75
3.	Calcutta	41.43
4.	Bombay	105.06
5.	Hyderabad	15.00
6.	Bangalore	36.80
7.	Ahmedabad	32.00
8.	Bhopal	9.23
9.	Jaipur	10.05
10.	Lucknow	11.50
11.	Chandigarh	6.40
12.	Vadodara	4.11
13.	Visakhapatnam	3.64
14.	Vijayawada	5.43
15.	Kanpur	18.50
	Total Population	**423.90**

TOWNS/CITIES UNDER URBAN MALARIA SCHEME SHOWING MORE THAN 10% SPR DURING 1991-93 REQUIRING ACCELERATED UMS

Sl.No.	Name of the Town	Population (in lakhs)
1.	Chaibasa (Bihar)	1.00
2.	Bharuch (Gujarat)	1.12
3.	Dohad (Gujarat)	0.56
4.	Godhra (Gujarat)	1.00
5.	Jodhpur (Rajasthan)	5.06
6.	Bharatpur (Rajasthan)	2.05
7.	Bellary (Karnataka)	2.01
8.	Tuticorin (T.N)	0.27
9.	Erode (T.N)	1.73
10.	Dindigal (T.N)	1.19
11.	Rourkela (Orissa)	4.18
12.	Sambalpur (Orissa)	1.80
13.	Nabha (Punjab)	0.49
14.	Dimapur (Nagaland)	0.60
	Total Population	**23.06**

(iii) All fever cases from whom the blood smears are collected should be given presumptive treatment with appropriate antimalarials.

(iv) The blood smears collected by the peripheral staff and at OPD of the hospitals will be examined expeditiously.

7.3.1. Case Detection by Voluntary Workers

If considered, FTDs may be opened @ one per 2000 population with a voluntary worker in the slum areas with at least one FTD holder in each slum. Their functions & duties will be same as FTDs in rural areas.

7.4. STAFFING PATTERN FOR CASE DETECTION

The staffing pattern for active case detection now recommended by the Expert Committee will be as follows:-

(a). One worker for 20,000 population for active surveillance in slum areas. The slum area population may be estimated by the local body to provide adequate staff.

(b). One worker for strengthening passive surveillance/ activating passive surveillance to be posted at each dispensary/public hospital with an OPD attendance of 200 cases per day. In the afternoon, this OPD malaria worker can be assigned active case detection in the population adjoining the institute where he is posted.

7.5. SLIDE EXAMINATION AND ESTABLISHMENT OF MALARIA CLINIC

Microscopic examination of blood smears collected by the surveillance worker through the active and passive case detection agencies will be done at malaria clinic(s).

It has been decided to open one malaria clinic for 50,000 population or part thereof. Each malaria clinic will be manned by a trained laboratory technician for malaria microscopy.

- He will maintain all records and send reports as laid

down for PHC laboratory.

- The same proformae will be used by him.

- He will report to the local body, officer incharge of antimalaria programme, who in turn will send the reports to State Health Directorate and Directorate of NMEP.

- Location of Malaria Clinics :

Malaria Clinic preferably should be located adjoining to slum area and wherever feasible, its location should be in an existing dispensary.

7.6. EXISTING STAFFING PATTERN : ANTI-LARVAL OPERATIONS

Statement showing scale on which the anti-larval staff is provided:

a). The anti-larval staff has been provided on the basis of the Municipal area of each town to be covered.

b). The Municipal area is divided into wards of 25.6 sq. kms.(10 sq. miles) each. If a town is less than 25.6 sq. kms. one ward is allotted.

Each ward is divided into 10 Sectors and each Sector comprises of 2.56 sq. km. (1 sq. mile)

i). **Staffing Pattern for a Sector**

Anti-larval staff for each of 2.56 sq.km. Sector of the town on 12 months basis :

a). Superior Field Worker - 1

b). Field Workers - 2

c). Field Worker for desilting,deweeding and minor levelling. - 1

ii). **Staffing Pattern for a Ward**

Supervisory and Technical Staff for each ward on 12 months basis :

a). Malaria Inspector - 1

b). Insect Collector - 1

iii).For towns having up to 40 Sectors, I jeep with trailer is provided along with a driver.

For towns having more than 40 Sectors, 2 Jeeps with trailers and 2 Drivers are provided.

iv). Generally the staffing pattern will be on the above basis but minor variations and modifications may be made according to the need of the town.

v). A Biologist/Antimalaria Officer as overall incharge is provided to supervise the Scheme.

7.7. SHORT - TERM INTERVENTION MEASURES IN URBAN AREAS

The intervention measures in urban areas for control of malaria transmission as laid down in the Urban Malaria Scheme should continue. However, emphasis should be placed on:

(i). water management by providing appropriate water supply and disposal

(ii). improvement of storm water drainage

(iii). source reduction of peri-domestic water bodies by drainage and filling in urban and peri-urban areas

(iv). indoor space spray with pyrethrum in and around 50 houses where malaria positive case is detected

(v). the civic by-laws should be enacted and enforced by the municipalities and corporations. A copy of the model Civic by-laws is at Annex-6.

7.8. ROLE OF DIFFERENT CATEGORIES OF STAFF UNDER URBAN MALARIA SCHEME

7.8.1. Field Worker

a). After roll-call, the Field Worker will help the Superior Field Worker in collecting material and equipments required for the day's work.

b). He will check the equipment whether in good working condition and leak proof.

c). He will apply the recommended larvicide in all the breeding places assigned to him with correct dosage and technique.

d). He will be held responsible, if any breeding place is left untreated in his area.

e). He will keep the drains and water collections free of vegetation.

f). He will ensure that water storage containers are emptied once in a week.

g). He will obey the instructions of Superior Field Worker for all sorts of duties connected with anti-larval measures such as source reduction, minor engineering, desilting, etc. assigned to him.

7.8.2. Superior Field Worker

a). Being incharge of a Section, he should ensure efficient anti-larval measures in his area.

b). He should carry a copy of the map of his Section showing all the permanent and temporary breeding places as well as jurisdiction of each day's work.

c). He should furnish account of larvicides received and consumed during the day to the Ward/Malaria Inspector.

d). He will be personally responsible for proper maintenance and safety of the equipment issued to him. After

day's work, he will check the equipment and undertake minor repairs, if any, so that the equipment will be ready for next day's work.

e). He should distribute the work to the Field Workers in such a way that the responsibility of each Field Worker could be fixed, in case an untreated mosquito breeding place is detected.

f). He will maintain a diary of work done and present the same to the visiting supervisory officer.

7.8.3. **Insect Collector**

a). Insect Collector, being a part of cross-checking of control operations, plays a key role in monitoring and improvement of control strategy.

b). He will obtain necessary equipments and material for collection of entomological data.

c). He will notify his arrival for mosquito collection to the householder and arrange to have a male member of the family with him during the period of his presence in the house.

d). A minimum of four fixed mosquito catching stations and an equal number of random catching stations are to be visited by him on every working day in the morning for mosquito collection and maintain the entomological records indicating area-wise and catching station-wise mosquito collection.

e). He will familiarise himself with entomological techniques such as per man-hour density, larval density and identification of adult mosquitoes, susceptibility tests, dissection of mosquitoes, preservation of material and recording of data in the afternoon.

f). He will assess anti-larval operations by correlating the same with adult vector density and larval density in

different localities during his field visit between 6 a.m. and 12.00 noon.

7.8.4. **Malaria Inspector**

a). He should be proficient with requisite technical knowledge and skills on anti-larval measures, indoor space spray with pyrethrum and undertaking appropriate remedial measures, such as source reduction, bio-environmental control measures, especially judicious use of larvivorous fish, wherever feasible and right choice of chemical larvicide.

b). He will be responsible for proper output of work of the staff working under him.

c). He will ensure proper dosage of larvicides and detect wastage or pilferage.

d). He should spot out the undetected breeding places and report the same immediately to the Biologist/Antimalaria Officer and the concerned SFW for enumeration and regular treatment.

e). He will cross-check the control operations concurrently and consecutively.

f). He will ensure that the field staff perform full day's work. He will be held responsible for detection of untreated breeding places.

g). He will supervise activated surveillance especially in problem Sections and slums.

h). He will ensure proper maintenance of equipment and fix the responsibility for loss of any equipment or material.

i). He will identify the mosquitoes, especially ***An.stephensi*** **and** ***An.culicifacies***

j). He should maintain the registers, records and logistics and submit the report to the Medical Officer/

Antimalaria Officer within the stipulated time regularly.

7.8.5. **Biologist / Antimalaria Officer**

a). He is overall incharge of all the control operations including planning, concurrent and consecutive supervision and evaluation.

b). He should study the breeding habitats of mosquitoes especially ***An.stephensi*** and ***An. culicifacies*** during all seasons.

c). He should ensure that the scheme is implemented correctly as per the guidelines issued by the programme headquarters of the State and the Centre and submit Monthly Technical Reports regularly. (vide Appendix-VI)

d). He will, on technical consideration, select the type of larvicide/biocide/other bio-environmental methods to control mosquito breeding in domestic and peri-domestic water collections. (vide Annex-3 and 4)

e). He should thoroughly familiarize himself in all the technical aspects regarding the correct dosage of larvicide application, reconnaissance survey, logistics, determination of area allotted to each field worker, supervision, cross-checking of field work, etc.

f). He should spend at least four hours in the morning in the supervision of anti-larval measures through concurrent, consecutive and surprise visits and test-check the breeding places in all areas specially in malaria problem wards and sections.

g). He should ensure that 50 households in and around every positive case are given indoor space spray with pyrethrum. (vide Annex-2)

h). He will undertake bio-environmental control measures wherever feasible, as an alternative to chemical control measures. He will establish hatcheries for larvivorous

fish such as Gambusia, Guppy, etc.

i). He will monitor susceptibility status of urban vectors at six monthly intervals, with WHO larval susceptibility test kit and send the results to State Malariologist, ROH & FW and Dte. of NMEP alongwith Monthly Technical Reports and Annual Report.

j). He will ensure that the civic by-laws are strictly enforced for elimination or prevention of domestic and peridomestic mosquitogenic conditions. (vide Annex-6)

k). He will organise activated passive surveillance in respect of dispensaries, clinics, hospitals, private practitioners, voluntary FTD holders in slum areas, etc.

l). He, as a Member-Secretary, will organise High Power Board meetings every month under the Chairmanship of Administrative Head of the local body with intersectoral administrative heads for co-ordination of anti-mosquito measures. He will send copies of the minutes of the High Power Board meetings and Action Taken Report to the State Malariologist.

8. INTERSECTORAL CO-ORDINATION

It is a well known fact that the developmental activities undertaken by different sectors are responsible in the proliferation of mosquito breeding places and thereby dramatic increase in malaria incidence. It is reiterated that intersectoral co-ordination should play a key role in the containment of malaria.

A High Power Board on malaria should be constituted at the Centre, State and District Levels. These Boards should meet on a specified day every month to review the progress of work and also action taken report on the minutes of the earlier meeting(s). The High Power Board should be chaired by the Health Secretary at the Centre, Chief Sec-

retary at the State level and Collector at the District level.

Many developmental projects are in operation for upliftment of rural poor. The Medical officer of PHC will send his observations on mosquitogenic situations in his area created by other developmental sectors, after discussing with his field staff in the monthly meetings to the Member Secretary of the District High Power Board. Simultaneously he will involve other sectors not only in the containment of malaria but also in the prevention of mosquitogenic conditions. He has to coordinate in the monthly meetings held at the block headquarters with the officials of these sectors and apprise the progress in action taken report to the Members Secretary of the High Power Board at the district level. He will oversee implementation of resolutions of High Power Board in his area and submit his report to the Member Secretary. He will guide the staff of PHC to educate the community on the need and measures for prevention of mosquitogenic conditions and will do the same during his school visits.

Similar boards should also be constituted in all Urban Malaria cities/towns. The Administrative Head of the local body should chair such boards. All the identified sectors such as Public Works, Irrigation, Industry, Communication, Transport, Fisheries, Environment, Forestry, Railways, Developmental Projects, etc. should be represented in the High Power Board by the administrative heads of the respective sectors for the effective implementation of the measures. The minutes of the meeting at town and district level should be communicated to the Chairman at the State level and the State Boards should send the progress report to the Health Secretary at the Centre with a copy to the Dte. of NMEP. The concerned organisations should create a cell for High Power Board for monitoring the progress of work.

9. RECORDS AND RETURNS

The proformae for maintenance for records and returns of reports within the stipulated dates are given hereunder:

The Malaria Forms from MF-1 to MF-16 are given at Appendix-IV.

9.1. MULTIPURPOSE WORKER

9.1.1. Village and Family Health Register

The village family register can be maintained in the Family Health Register (MF-1) or in the proforma prescribed by CBHI under new H.M.I.System.

9.1.2. **The MPW (Male) shall send 2 copies of MF-2 alongwith slides to the PHC on every Wednesday and Saturday. Under column 5 of this proforma, age and sex of the fever case are also to be provided and only abbreviation of the sex will be given as M (Male) and F (Female). For instance, if there is one male fever case of 5 years age, it will be written as 5 (M) and like-wise.**

9.1.3 Tour Journal-cum-work statement to be sent to Malaria Inspector and PHC (MF-3a)

9.2. LABORATORY TECHNICIAN AT PHC

9.2.1. Registers and Forms to be Maintained

a). Subcentre-wise MF-2 forms of blood smears indicating case number against the positives.

b). Blood smears receipt and examination register (MF-8).

c). Subcentre-wise details of positive cases and remedial measures register (MF-7).

d). Master Register of epidemiological evaluation section-wise and village-wise (MF-9).

9.2.2. Charts to be Maintained at PHC Level

The Charts to be maintained at PHC are given at Appendix-VII.

a). Area map showing jurisdiction and headquarters of sub-centres, passive agencies and indicating villages.

b). Subcentre-wise master chart based on epidemiological evaluation master register.

c). Passive agency-wise, showing new cases, fever cases, blood slides collected & positives detected. Fever Treatment Depots collecting slides will be considered as passive agency. This information will be based on the report received from the passive agencies or the Fever Treatment Depots on malaria form (MF-10).

d). Back-log of unexamined blood slides alongwith number of positives-ladder chart.

e). i). Back-log of radical treatment alongwith positives -ladder chart.

ii). Stock register of antimalarials and other material and equipment received from time to time.

iii). Stock register of the insecticides received from the district store.

9.3. HEALTH SUPERVISOR AT PHC

He should maintain:-

a). Return of MF-2 with results from PHC Laboratory.

b). MF-2 of his own area for active and mass survey and follow-up smears. Copies in duplicate to be sent to PHC alongwith blood slides.

c). Subcentre-wise and village-wise positives with period of R.T., Mass Survey and Focal Spray (MF-7).

d). Tour journal-cum-work statement to be sent to Malaria Inspector and PHC (MF-3).

e). Current stock register of tablets, slides, service postage, etc.

9.4. MALARIA INSPECTOR

He should maintain:

a). Subcentre-wise details of positive cases and remedial measures especially spray (focal) and mass and contact surveys (MF-7).

b). Stock registers for insecticides received for his subdivision or areas (PHCs).

c). If community therapeutic measures (Mass Suppressive Treatment) are undertaken, he will be responsible for it and record will be maintained in MF-11 and copy will be sent to the PHC for record.

d). He will be responsible for organisation of R.T. in his area taking equal share of R.T. on himself.

e) Tour Journal-cum-work statement to be sent to PHC.

9.5. REPORTS TO BE SENT BY PHC

i). The PHC should post on every Saturday the Savingram to District Headquarters in MF-11 given at **Appendex-IV (L)** showing Weekly Epidemiologcial report.

ii). MF-4 : The age groups changed as 'below 1 year', '1-4', '5-14' and '15 and above' in the last column (17-24) are given in the revised MF-4, which is meant for the monthly report from the PHCs.

iii). MF-5 : Monthly Technical Report: Subcentre surveillance data and remedial measures in form MF-5, col.9, instead of 'other', *Pm.* should be written.

iv). MF-6 the progress and assessment of spraying shall be sumitted without delay.

v). MF-10 : Besides submitting the report regularly, it may be ensured that FTDs and VLWs cover the entire population in high risk areas.

vi). The information in the proforma given at Appendix-I, II(A) and II(B) is to be submitted annually.

9.6. DISTRICT LEVEL

9.6.1. Registers to be Maintained

a). Subcentre-wise in rural areas and locality-wise in urban areas, data will be maintained by the District Malaria Officer based on the master register of epidemiological evaluation (MF-9). However, the age-wise break-up of the positives will be as — below 1 year, 1-4, 5-14, 15 & above in the respective columns provided in the form.

b). Tour journal-cum-work statement to be sent to PHC before 5th of succeeding month (MF-12) which should be sent to Malaria Inspector and PHC for undertaking corrective measures. .

c). Running stock register of tablets, microslides, service postage, etc. to be maintained by the worker.

d). The information in proforma at Appendix II(C) and II(D) is to be submitted annually.

9.6.2. Charts to be Maintained at District Level

i). PHC-wise master chart based on the weekly Savingram information.

ii). Graphs indicating the fever incidence and the positive incidence in various PHCs.

9.6.3. Reports to be sent to the Zonal Malaria Officer, State Malariologist and Regional Director, ROH&FW

i). PHC-wise epidemiological situation report based on the Savingram received from the Medical Officer PHC on

malaria form (MF-11).

ii). Monthly technical reports PHC-wise received from the Medical Officers, PHCs on MF-4 and MF-5 and MF-6.

iii). Monthly expenditure reports under different sub-heads for the district.

9.6.4. Visits of District Level Officers

MF-13 form is meant for the District Chief Medical Officers in relation to their visit to the Primary Health Centre, MF-14 form is meant for the Dy.Chief Medical Officers of Health or the District Health Officers as the case may be.

9.7. ZONAL LEVEL

In their office - Zonal Officers shall project administrative, epidemiological and operational data in regard to districts in their jurisdiction while Zonal Officers may maintain extra charts depending on any special problems and studies made. The following shall necessarily be maintained in all the zonal offices.

i). Names of Senior Officers in the Zone adopting the following proforma (this includes Gazetted Officers and Sub-Unit Officers)

Sl.No.	Name of the Officer	Date from which working

ii). District (separate for each district) chart showing blood smear collection and positives

Sl.No.	Year	B.S. collected	Positives detected			
			Pv	*Pf*	Mixed	Total

iii). Chart showing tour particulars of each District Malaria Officer in the zone

Sl.No	Name of the Officer	District for which he is incharge

January to December (under each month) furnish tour days, night halts, villages visited and positives checked.

iv). For current year, month-wise blood smear collection, examination, positives and remedial measures separately for each district.

v). A map of zone showing names and boundaries of districts, and PHCs. Separate colours may be used to show subcentres under spray/ not under spray.

vi). PHC-wise positive malaria cases based on Savingrams consolidated and sent by District.

9.8. REPORTS TO BE SENT TO THE DTE. OF NMEP BY THE STATE MALARIOLOGIST AND THE DISTRICT MALARIA OFFICER

State Level:

Reports to be sent to the Directorate of NMEP, Delhi and the Regional Office for Health & F.W.

The monthly epidemiological situation report will be submitted by the States on the proforma based on the information given in MF-11.

Columns regarding tour have been added in the epidemiological situation report in order to keep a strict watch on the tour of the District Malaria Officer. As the District Malaria Officer has been relieved much of the administrative functions in order to increase the supervision in the field for which not less than 18 days of tour in a month is to be done by him and for each tour there should not be less than 4 consecutive nights spent outside the headquarters.

The **State Progamme Officer** should send the following to the Dte. of NMEP, Delhi. (Vide proforma given on page - 96)

NAME OF THE STATE .....

MONTHLY EPIDEMIOLOGICAL SITUATION REPORT FOR THE MONTH OF ..... , 1995

S. No.	Name of the District	Year	During the Month					Progressive Total						Deaths			
			B.S.C.	B.S.E.	No. +ve	P.f.		B.S.C.	B.S.E.	No. +ve	P.f.		R.T. Given	During the Month		Progressive Total	
						R	RG				R	RG		*Microscopically Confirmed	Clinically diagnosed	*Microscopically Confirmed	Clinically diagnosed
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
		1994 1995															
		1994 1995															
		1994 1995															
		1994 1995															
		1994 1995															
		1994 1995															
	Contd.																
	Total	1994 1995															

* The cases recorded under column 15 and17 are not to be repeated under column 16 and 18 respectively.

i). Consolidated district-wise monthly technical reports received from PHCs on MF-4, MF-5 and MF-6 and total for the State.

ii). Monthly expenditure report under different subheads for the State.

iii). Monthly report of the number of Drug Distribution Centres/Fever Treatment Depots, Malaria Clinics established and the number of cases attended (MF-16).

iv). Annual report indicating the vacant posts category-wise and District-wise.

v). MF-16 : The report on DDC/FTD performance is to be sent annually.

vi). The information in proforma at Appendix III is to be sent annually.

Tour reports of the District Malaria Officer (MF-12) and Zonal Officer (MF-15) received by the State Malariologist will be reviewed and necessary comments will be sent to the officers concerned for rectification and for taking necessary action with a copy to the Regional Office for Health & Family Welfare.

10. INFORMATION, EDUCATION AND COMMUNICATION (IEC)

Under IEC, health education and creation of healthy environment for malaria control is very important. It is designed to educate masses on malaria and motivate them to utilise the facilities available to them under malaria control programme. Personal protection methods are given at **Annex-5.**

As recommended by the Expert Committee on Malaria, the NGOs are the best agencies for conveying health message in the remote hardcore and epidemic prone areas.

The details of IEC are given in **Annex-7 and 8.**

The State Governments should earmark sufficient funds for the production of health education material in the local language in supplementing the efforts of Govt. of India as detailed in **Appendix 5C** of the Expert Committee Report.

The Missionaries and NGOs which are involved in the remote tribal and other malarious areas in various developmental projects could be roped into malaria work also. These voluntary agencies should be given sufficient material support in the dissemination of message. The organisations like Integrated Tribal Welfare Agency/Project will be of immense use in the identification of voluntary organisation in different remote areas.

The FTDs/DDCs and Voluntary Link Workers should be suitably and extensively utilised in health education work.

11. MALARIA EPIDEMICS/FOCAL OUTBREAKS - MONITORING AND CONTROL

11.1. TYPES OF EPIDEMICS

An epidemic is defined as the occurrence of sickness of similar nature in the community clearly in excess of normal expectancy derived from common propagative sources. Normal expectancy is in terms of number of persons sick with the same sign and symptoms over a period of time in an area. In case of malaria the epidemic situation is suspected, if a large number of fever cases report to the OPD of PHC/Dispensaries, Hospital and majority of these cases are clinically suspected to be suffering from malaria.

Periodic Epidemics - These are:

(a) Cyclical Epidemics:

Occur at 7 to 10 years intervals in India

(b) Seasonal Epidemics:

Fluctuations in malaria incidence during rainy, winter and summer seasons.

In areas where control activities are disrupted, the focal outbreaks (i.e. **localised seasonal epidemics)** occur usually leading to high morbidity and mortality due to malaria.

11.2. KEY FACTORS TO BE MONITORED FOR PREDICTION AND EARLY DETECTION OF MALARIA OUTBREAKS

The following are the key factors which usually signal a warning that helps in prediction and early detection of a malaria **focal outbreak.** MO PHC/DMO should carefully and regularly watch for them.

i) Parasite load : look for variations/increase in

- number of fever cases
- species distribution P.v. , P.f.

ii) Vector Dynamics

- increase in mosquito density
- increase in vector density

iii) Population Dynamics

- influx of migrants from non-endemic to endemic areas and vice-versa
- tropical aggregation of population in projects
- large labour movement to forest or for agriculture
- Population migration during floods and drought

iv) Environmental/Climatic conditions

- early and heavy rainfall in pre-transmission period i.e. May/June in Northern India
- increased humidity during above period.
- Natural disasters like:-
    * floods following monsoon rains

* drought resulting in drying up of river bed and other water bodies with pool formation
* earthquake, etc.

In case there is a gross palpable variation in any of the above four factors the MO PHC/DMO/MO I/C Mobile Epidemic Control Unit should undertake the systematic investigations as mentioned below to confirm and delineate epidemic zones.

11.3. MONITORING OF MALARIA INCIDENCE

It is, therefore, necessary that the Medical Officer of PHC and District Malaria Officer should keep a watch on malaria incidence in the community.

a) The malaria incidence of the current month should be compared with the incidence during the same month of preceding year(s). For example, the incidence of July, 1994 should be compared with the incidence of July, 1993 and so on.

b) The second determinant is the **"Trend"** of malaria incidence in the area during the year under investigation i.e. month-wise malaria incidence, trends for two consecutive years are compared. In this case any unusual increase or decrease in the malaria cases over a period of time is analysed.

If the PHC Medical Officer analyses the data in MF- 9 (village-wise register of the PHC), he cannot miss any unusual change in malaria incidence in the community/villages. He can analyse the trends of incidence in different villages vis-a-vis the number of fever cases from the same area reporting to PHC OPD. This is one of the important steps taken by the PHC in analysing the malaria situation for monitoring an epidemic build up.

Other sources of information are:

(a) Rise in malaria positivity rate in the laboratory examination.

(b) Rising fever incidence reported by (i) FTD holder/ MPW (ii) Community leaders, (iii) Press, (iv) Legislature and (v) Medical Practitioners of the area.

Such reports should be carefully assessed along with laboratory positivity rate of the area. If the positivity rate is high, it is likely to be the beginning of a malaria epidemic in the area and requires immediate careful investigation.

11.4. CROSS-CHECK OF LABORATORY RESULTS

The high positivity rate in the laboratory should be confirmed by cross - checking of the positive slides by an independent Laboratory Technician/Medical Officer, PHC.

If the laboratory diagnosis is confirmed, the first action to be taken is to delineate the areas/population affected.

OR

If the laboratory diagnosis is not correct as confirmed by high discrepancy rate in cross-check results, check the laboratory equipment such as microscope, JSB Stain, quality of blood smears and their staining and ascertain that the results of backlog slides examined are correctly reflected in the corresponding month. **The Laboratory Technicians, MPWs, etc. should be given a refresher training, if required.**

If there is low slide positivity rate as reported by the laboratory, but the high fever rate reported by the sources enumerated above, it is necessary that the MO PHC clinically assesses the cause of high fever rate and if high number of clinical malaria cases are observed, then MO PHC should check MF-9 for confirming regularity of domiciliary

visits at fortnightly intervals to the villages. This gives an idea about adequacy of coverage or otherwise of case detection by MPWs/FTDs.

If some villages had not been visited by MPW (Male) for a long time, carry out rapid fever survey in such villages to ascertain the current malaria situation.

If an epidemic is predominantly of *P.vivax* infection, then it is certain that first round of insecticide had not been given in time as scheduled or coverage was poor. Further the case detection/drug distribution was not done for at least 2 or 3 months.

If an epidemic with *P.falciparum* predominance is seen with deaths of microscopically confirmed *P.falciparum* cases, then both rounds of insecticidal spray were either not given or coverage was extremely poor. Futher case detection and drug distribution were not done for at least 4 to 5 months.

On the basis of aforesaid dictum the administrative action should be taken.

11.5.DELINEATION OF AFFECTED AREA - RAPID SURVEY

To delineate the area affected by the epidemic, it is necessary to carry out rapid malaria survey, the methods adopted can be:-

Having ascertained that there is an epidemic situation in some of the villages of PHC, the PHC Medical Officer/District Malaria Officer will make arrangements for delineation of the epidemic area and to find out the extent and severity of the epidemic.

They will immediately inform the Mobile Malaria Ep-

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idemic Control Team* at District level, the Zonal Officer and State Programme Officer to help in the delineation of the area and implementation of containment measures on war-footing.

11.5.1. Rapid Fever Survey

During Rapid Fever Survey, every village in the suspected epidemic zone is covered and only fever cases or cases with history of fever are taken up and their blood smears are examined.

11.5.2. Mass Survey

As an alternative, mass survey of the entire population shall be carried out in every village irrespective of age & sex or fever status. Specially children must be included in the survey.

It is necessary to expand the area of survey centrifugally from the epicentre of the epidemic till areas with normal positivity rates are reached. Thus the size of the area involved in the epidemic zone is delineated.

To carry out the surveys, it is always advantageous to establish field laboratories by pooling Laboratory Technicians from adjoining PHCs, Districts, Zonal Office or State Headquarters laboratories and pool the peripheral staff from the PHC area to collect blood smears so as to cover the entire population as quickly as possible. This operation should be over in 7 to 10 days.

-Blood smears collected should be examined within 24 hours.

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* Note:- The composition and other details of the team are given on pages 61 and 62.

- All age groups should be covered, especially high risk population i.e. children, pregnant women and migrants

- All persons whose blood smears are collected should be given presumptive treatment with Chloroquine or mass radical treatment with a single dose of Chloroquine and Primaquine.

- All positive cases should be given radical treatment at the recommended doses.

11.6. ESTIMATION OF POPULATION INVOLVED.

The next step in the exercise is to calculate the population involved in the epidemic areas. This can be done by taking the village-wise population from MF-1 or the census population of the villages identified, whichever is readily available at the PHC.

Epidemic Control Proforma - 1

List of villages within the malaria Epidemic Zone

P H C_____ Subcentre_____

S.No.	Name of village	Population	No. of households
1.	2	3	4
1. 2. 3. 4. contd.			
Total			

11.7.MEASURES FOR LIQUIDATION OF FOCI

Having ascertained the population at risk and the number of households in which measures to liquidate the epidemic are to be implemented, the anti-vector and anti-parasitic measures should be planned as under :

11.7.1. Anti-vector Measures

a). Space Spray

i). Every house in all the villages of the area affected by the epidemic should be covered.

ii). Indoor space spray should be carried out for 7 to 10 consecutive days or till the residual insecticidal spray in all houses of the locality is completed.

The equipment required for space spray will be a hand operated micro-discharge fogging machine/hand operated atomizers (Flit pump).

Insecticide for indoor space spray will be pyrethrum.

b). Residual Insecticidal Spray

i). The indoor residual insecticidal spraying operation should be started simultaneously with indoor space spray.

ii). The insecticide of choice will be the insecticide to which the local vector is susceptible.

iii). Apply the recommended dose of insecticide chosen.

- Cover all houses and mixed dwellings including sleeping rooms

The cattle sheds need not be sprayed.

c). Urban Areas

The space spray with Pyrethrum should be done in 50

households in and around a positive household.

Intensify anti-larval operations in addition to **indoor space spray,** and carry out Rapid Fever Survey. Give presumptive treatment to fever cases and Radical Treatment to all positive cases.

d). **Other Measures**

Apart from space spray and residual insecticidal spray, some times it may be necessary to resort to other anti-vector measures. Such measures should be implemented on the basis of results of entomological findings.

e). **Entomological Investigations**

The Zonal Officer should depute the Zonal Entomological team to carry out vector density studies. They should report the findings to the Medical Officer incharge of epidemic control measures. They should point out the prolific breeding places requiring immediate action.

If the epidemic is due to predominance of vector breeding in water storage tanks or in peri-domestic water collection, it will be necessary to undertake anti-larval measures along with space spray and residual insecticidal spray.

Later on, the detailed entomological investigations may be carried out to ascertain the susceptibility status of the vector(s) in the locality.

11.7.2. **Anti-Parasitic Measures**

During the initial period of delineation, Mass Radical Treatment or Fever Radical Treatment is recommended as first line of containment. After intensive surveillance all positive cases shall be given Radical Treatment as per drug schedule.

11.7.3. Duration of Epidemic Control Measures

The entire exercise should be completed in a period of 7 to 10 days and in any case not exceeding a fortnight (i.e. within one extrinsic incubation period) so that secondary cases are prevented.

11.7.4. Follow-up Action

To see the impact of remedial measures, it is necessary to take the following follow-up actions :

a). Carry out mass survey or rapid fever survey in the area where remedial measures have been implemented. The same procedure as mentioned for the first survey is to be adopted and field laboratory is established.

b). Two consecutive follow-up surveys are to be carried out; the first survey 21 days after remedial measures are completed and the second survey 21 days after the first follow-up survey.

c). During these surveys **no mass radical treatment** is to be given. Only presumptive treatment shall be given.

d). Strengthen the case detection operations and ensure fortnightly visits to all villages.

e). Activate all FTDs and Voluntary Link Workers.

f). Investigate cause of epidemic by an epidemiological investigation to find out whether the epidemic was due to :

i). Influx of migratory population which was not covered by routine control measures such as screening at the entry points and regular fortnightly surveillance in the project areas.

ii). Whether it was due to breakdown of regular malaria control operations.

iii). In some instances unusual **natural calamities** such as floods, heavy rains, drought with opening up of relief camps and other temporary relief measures with temporary shelters for migratory population may be responsible for an epidemic and disruption of operations.

11.8. DETAILED PLANNING OF EPIDEMIC CONTROL MEASURES

Proforma - II

11.8.1. Mass Survey - Period: Seven Days

Manpower Requirements

$$\frac{\text{Population} \times 2}{100 \times 7} = \text{No. of persons required for B.S. Collection and Administration of Presumptive Treatment.}$$

(It is expected that two member team can collect 100 blood smears per day)

If the mass survey cannot be completed in seven days, it can be extended by another three days. Any further delay will result in extension of epidemic zone and deaths.

11.8.2. Material required

a) 4 Aminoquinolines (in terms of 150 mg base tab.) - Population × 3

b) Primaquine (in terms of 2.5 mg base tab.) - Population × 18

c). Microslides - Population × 1

d). No of microscopists required - $\frac{\text{Population}}{50 \times 7}$

e). No. of microscopes required - one per microscopist

f). Cotton, Spirit/Savalon, slide boxes, pricking needles, stationery, etc. to be procured on ad-hoc basis.

g). J.S.B. Stain as required.

h). Other material for cleaning and packing of slides etc. can be estimated on ad-hoc basis.

Proforma -III

PROFORMA FOR FIELD RECORDING OF SURVEY DATA

PHC____ ; Subcentre_____ ; Village____ ; Total Pop.___.

S.No	Head of the Family	Name	Age	Sex	Presence of fever	
					Yes	No.
1	2	3	4	5	6	7

Drugs		B.S.Examination			Remarks
4AQ	8AQ	Pv	Pf	Mixed	
8	9	10	11	12	13

11.8.3. **Anti-vector Measures**

a). Space Spray - **should be started as soon as survey results of a village are available.** Do not wait for completion of survey in the entire area. Other villages are included as soon as the survey results are available.

Formulation (vide Annex-2)

Pyrethrum extract 2% - Dilute 1 litre with 19 litres of kerosene oil to make 0.1% ready to use spray.

(or any other formulation readily available like 'Finit', 'Hexit' or 'Baygon', etc.)

Dosage - 15 to 30 cc to be sprayed in 30 cubic metres of space

Equipment - Hand operated micro-discharge fogging machine / hand operated atomizers (Flit pump).

Timing - Preferably early morning or late evening hours

Precaution - Close all doors/windows and other openings before space spray.

b). **Residual Insecticidal Spray Operations.**

Manpower and equipment required for 10 days operation :

i). No of spray squads required to cover the area

Plain Area - $\frac{\text{No of human dwellings and mixed dwellings in the villages targeted}}{600}$ = No. of spray squads

(at the rate of 30 houses per pump per day)

Hill Area - $\frac{\text{No. of human dwellings and mixed dwellings in targeted villages}}{500}$ = No. of spray squads

(@ 25 houses per pump per day) depending upon terrain

ii). Field Workers = No. of Squads × 5

iii).Superior Field Workers = No. of Squads × 1

iv). a). **Stirrup Pumps** = No. of Squads × 2
one pump as reserve for 2 squads.

b). **Bucket** 3 gallon capacity = No. of Squads × 4

c). **Bucket** 2 gallon capacity = No. of Squads × 1

d). Soap, straining cloth, nozzle tips, measuring jug, rope, pump repair kit, asbestos thread, washers and plastic sheets as required.

v). **Insecticide required** should be calculated proportionately for the population affected by epidemic for one round of spray only.

- DDT 50% wp @ 75 MT per million population
- Malathion 25% wp @ 300 MT per million population
- Deltamethrin 2.5% wp @ 30 MT per million population

- Cyfluthrin 10% wp @ 9.38MT per million population
- Lambdacyhalothrin 10% wp @ 9.38 MT per million population

The insecticide formulations and their dosages for indoor residual spray are given in Annex-1.

After completion of rapid fever survey or mass survey, the field data of Proforma-III are tabulated in Proforma-IV given below for epidemiological evaluation and analysis of the pattern and course of epidemic.

10.9. RESULTS OF MASS SURVEY IN EPIDEMIC AREA

Proforma IV

PHC____ Subcentre_____

S.No	Name of Village	Population					
		<1	1-4	5-8	9-14	15 & above	Total
1	2	3	4	5	6	7	8

Population surveyed Blood smears collected						Drugs consumed		
<1	1-4	5-8	9-14	15 & above	Total	4AQ	8AQ	Paracetamol
9	10	11	12	13	14	15	16	17

Positives detected						% of Blood smears collected	Positives			
<1	1-4	5-8	9-14	15 & above	Total		Pv	Pf	Mixed	Total
18	19	20	21	22	23	24	25	26	27	28

Remarks
29

11.10. RESIDUAL INSECTICIDAL SPRAY

The insecticidal spray operations are planned village-wise. A ten day advance spray programme covering all villages in the epidemic zone is chalked out in the proforma prescribed for advance spray programme.

The MPW/Superior Field Worker of the mobile epidemic team will supervise spray and maintain diary to record daily achievement of spray coverage of human dwellings, mixed dwellings and rooms in the villages sprayed. On completion of spray coverage & space spray operations, completion report is prepared for both operations and sent to appropriate authorities.

11.11. REPORTING SYSTEM

11.11.1. **The State Malariologist, the Regional Director, ROH&FW and the Director, NMEP should be telegraphically informed by MO PHC/DMO when epidemic is suspected.**

11.11.2. **The final epidemic containment report should contain:-**

i). Proforma-I and IV of this Manual and the spray completion report along with epidemiological investigation. This report will be signed by the Medical Officer, PHC, District Malaria Officer and Medical Officer I/C Mobile Unit. It will be sent to State Programme Officer with a copy to Directorate of NMEP and Regional Director, ROH & FW.

ii). As soon as the epidemic is confirmed a copy of the Proforma-I giving the details of epidemic zone will be sent to State Programme Officer, Directorate of NMEP, and Regional Office for Health & F.W.

iii).The report of follow-up action/investigation of the first and second surveys will also be sent by MO, PHC, District Malaria Officer and Medical Officer I/C Mobile Team to State Programme Officer, Directorate of NMEP and Regional Director, ROH & FW.

iv). Epid. parameters in NMEP are given in Annex.-11

Annex - 1

INSECTICIDAL FORMULATIONS AND THEIR DOSAGES FOR INDOOR RESIDUAL SPRAY

S. No.	Name of the Insecticide	Preparation of suspension in water	Dosage per sq. metre of active ingredient	Residual effect in weeks	No. of spray rounds per annum	Requirement per million Population		Area to be covered by 10 lit of suspension to get correct dosage
						per round	per annum	
1	2	3	4	5	6	7	8	9
1.	DDT 50% wp	1 kg / 10 Lit	1 gm	10 - 12	2	75 MT	150 MT	500 sq. m
2.	BHC 50 % wp	1.5 kg / 10 Lit	200 mg (γ isomer)	6 - 8	3	112 MT	336 MT	500 sq. m
3.	Malathion 25% wp	2 kg / 10 Lit	2 gm	6 - 8	3	300 MT	900 MT	*250 sq. m
4.	Deltamethrin 2.5%wp (K-Othrine)	400 gm / 10 Lit	20 mg	10 - 12	2	30 MT	60 MT	500 sq.m
5.	Cyfluthrin 10% wp (Solfac)	125 gm / 10 Lit	25 mg	10 - 12	2	9.38 MT	18.75 MT	500 sq. m
6.	Lambdacyhalothrin 10% wp (ICON)	125 gm / 10 Lit	25 mg	10 - 12	2	9.38 MT	18.75 MT	500 sq. m
7.	Fenitrothion 40% wp	1.25 kg. / 10 Lit	1 gm	6 - 8	3	93.75 MT	281.25 MT	500 sq.m
8.	Pirimiphos-methyl 25% wp	2 kg / 10 Lit	2 gm	6 - 8	3	300 MT	900 MT	*250 sq.m

*To be sprayed in two coats i.e. after completing the first coat in all the rooms, the second coat may be given so that the required dose of 2 gm/sq. m. is obtained.

Annex- 2

INSECTICIDAL FORMULATIONS AND THEIR DOSAGES FOR SPACE SPRAY

S. No.	Name of Insecticide	Commercial formulation	Preparation of formulation	Equipment used	Remarks
1.	Pyrethrum extract	2.0% Extract	1 : 19 i.e. 1 part of 2% pyrethrum extract in 19 parts of Kerosene (v/v)	Flit pump or hand operated fogging (micro discharge) machine	Used for indoor space spray
2.	Malathion	Technical Malathion	5 parts of Tech. Malathion in 95 parts of Diesel oil (v/v)	Vehicle mounted thermal fogging machine. Speed of vehicle 6 km/hour or as recommended by machine manufacturers	Outdoor thermal fogging. Watch for wind conditions before fogging.

N. B. The requirement of 2% pyrethrum extract may be worked out on the basis of malaria positive cases in the past. One litre of 2% Pyrethrum after dilution with 19 litres of kerosene will be sufficient to spray about 400 households, each household having 100 cubic metres indoor space (i.e. 8 malaria cases @ 50 households in and around every malaria positive household)

Quality Control :

The insecticides and larvicides procured by the Directorate of NMEP are subjected to quality control certification through recognised laboratories by the Medical Supply Depots before despatching the material to the States. The samples collected from the field and sent to Directorate of NMEP are also subjected to quality testing at the recognised laboratories. There should not be any laxity in this regard. When there is slightest indication about the quality, the users should get the samples re-tested.

The insecticides/larvicides purchased by the State Governments should also be subjected to strict quality control, not only at the time of procurement but also throughout the shelf life period. They should get the quality control certificate from recognised laboratories.

LARVICIDAL FORMULATIONS AND THEIR DOSAGES

Annex- 3

S. No.	Name of Larvicide	Commercial formulation	Preparation of ready to spray formulation	Dosage per			Frequency of application	Equipment required	Remarks
				One sq. metre	50 Linear Metres	One Hectare			
1	2	3	4	5	6	7	8	9	10
1.	M L O	100% petroleum product	As it is	20 c.c.	1 Litre	200 Lit.	Weekly	Knapsack/ Hand compression sprayer	To be applied along the shore of water body
2.	Paris green	Powder	1 kg added to 99 kg of inert dust	10 gm	500 gm	100 Kg.	-do-	Hand or hand-operated duster	- do- Can be applied to water consumed by Cattle, etc.
3.	Temephos * (Abate)	50% E.C.	2.5 c.c. in 10 litres of potable water	20 c.c.	1 Litre	200 Lit.	-do-	Hand compression/Knapsack sprayer	Can be applied in all water bodies
4.	Fenthion* (Baytex)	100% E.C.	5 c.c, in 10 litres of potable water	-do-	-do-	-do-	-do-	-do-	Not applied in drinking water sources like wells, etc.
5.	*B. sphaericus*	Powder	500 gm in 10 litres of potable water (5% suspension)	-do-	-do-	-do-	Three Weekly	-do-	Not used in potable water collections
6.	*B. thuringiensis*	Powder	250 gm in 10 litres of potable water (2.5% suspension)	-do-	-do-	-do-	Two Weekly	-do-	-do-
7.	Aviation Gasoline Lead Free (AGLF)	Liquid	As it is	90 cc	4.5 Lit.	900 Lit.	Weekly	Sprinkling with the container	To use in potable/ drinking water bodies in the evening

* The dose of temephos or fenthion may be doubled or tripled in case of water bodies having more than 50 cm depth.

USE OF BIOCIDES IN MALARIA CONTROL

Two biocides namely, ***Bacillus sphaericus*** and ***Bacillus thuringiensis*** have been field tested and are now recommended for use under malaria control only in special situations.

- The breeding places where biocides can be used, may be selective water bodies in domestic and peri-domestic areas.

- However, the biocides being new larvicides should not be used for larval control in potable water i.e. drinking water collections/supply lines.

Preparation of biocide suspension

After weighing 500 gms of ***B.sphaericus*** or 250 gms of ***B.thuringiensis*** powder and measuring ten litres of potable water, the suspension should be prepared in two stages as given below:-

First a thin paste of biocide is prepared by adding a small quantity of water from the already measured water to 250 gms of ***B.thuringiensis*** or 500 gms of ***B.sphaericus*** powder. Then the thick paste is diluted with the remaining part of potable water and constantly stirred to obtain homogeneous suspension. This gives 2.5% suspension of ***B.thuringiensis*** or 5% suspension of ***B.sphaericus***

The suspension is sprayed @ one litre over 50 sq.metres or linear metres. (20 c.c per sq.metre or 200 litres per hectare water surface).

Dosage of biocide

In the experimental areas, all the breeding places except drinking water sources will be sprayed with biocide while in comparison area, the conventional larvicide will be

used. The dosage of biocide will be 5 kg of ***B.thuringiensis*** or 10 kg of ***B.sphaericus*** per hectare which comes to half or one gm/m^2 respectively. The dosage is based on the surface area of the breeding place irrespective of depth of water.

Frequency of application

Frequency of spraying is once in two weeks for ***B.thuringiensis*** and once in three weeks for ***B.sphaericus.*** However, the frequency of spraying in the Index Breeding Places will be only after detection of III and IV instar larvae. The frequency of spraying may be adjusted after studying the residual efficacy of biocide in the Index Breeding Places.

Selection of Index Breeding Places (IBPs)

The Index Breeding Places of different types, such as ditches, drains, storm water, borrow pits, etc. will be selected in the trial areas to determine the duration of efficacy as well as the dosage of biocides. About 100 breeding places will be selected. Initially the biocide will be applied in all the IBPs at the recommended dose and the subsequent applications of biocide will be made after detection of III and IV instar larvae. The IBPs are not to be sprayed in routine application of biocide.

Monitoring.

The Index Breeding Places will be checked every day. All other breeding places will be checked every week. If III and IV instar larvae are detected during cross-checking, the positive breeding places are to be treated with recommended dose of biocide within 24 hours of detection. The particulars of breeding places requiring additional round of biocide application will be maintained in separate proforma.

All details will be maintained in appropriate registers.

Safety precautions

All precautions adopted for the conventional larvicides are to be followed.

Reporting

Monthly technical report on parasitological and entomological findings will be forwarded to all concerned.

Staff requirement

Existing staff of Urban Malaria Scheme.

PERSONAL PROTECTION METHODS

IMPREGNATED BEDNETS

Quality of Bednets:

The standard bednet hole size should not be bigger than 1.2 to 1.5 mm diameter i.e. 6 to 8 holes to 10 mm. linear length. Nylon nets are preferred over cotton nets because the former are more durable, quicker in drying after impregnation and the insecticide stays longer on the surface of the nylon fibre.

Dosage:

The dosage is 25 mg per sq. metre in respect of Deltamethrin and Lambdacyhalothrin and 50 mg per sq. metre for Cyfluthrin. Thus 1 gm of Deltamethrin (2.5%) or 0.5 gm of Cyfluthrin (10%) or 0.25 gm of Lambdacyhalothrin (10%) is needed per sq. metre.

Methodology

i). The surface area of the bednet can be determined by measuring area of each of the four sides and top.

2(length+breadth) × height + (length×breadth) = total area

ii). The water absorbing capacity of the net is to be calculated by trial and error. The absorption capacity differs for different makes of material. The optimum quantity of water required for impregnation is to be determined. Hang moist net for drying in shade and there shall not be any dripping of water.

Residual Efficacy:

When not washed, the impregnated net will have effi-

cacy for six months. If washed, the impregnation may have to be done afresh.

Precautions:

i). The person impregnating the net should wear rubber gloves.

ii). He should avoid contamination of skin, eyes, mouth, etc. with insecticide formulation.

iii). If contaminated, wash with soap and water in the surgeon's fashion.

Tabular Summary of Personal Protection Measures

S. No	Method	Suitable For	Remarks
1.	Mosquito proofing of human dwelling	Pucca House	i) Thatched houses with eaves cannot be made mosquito proof by screening. ii) All members of household are protected once they are inside the house. iii) Collateral benefits such as protection from flies & other insects. iv) A person can perform normal household activity inside the house without restriction v) The method is costly to install but usually very little recurrent expenditure. vi) Not effective if the family members sleep outdoors.
2.	Sleeping under Mosquito net - plain / impregnated with insectcide	Use by an individual or members of family while sleeping indoor or outdoor.	i) Suitable for use by an individual. ii) The effectiveness as a protection against mosquitoes depends on sleeping time. iii) Can be used indoor or outdoor with equal effectiveness. iv) Not very costly. v) An individual remains exposed to mosquito bites after dusk till he goes to bed.

S. No.	Method	Suitable For	Remarks
			vi) No other collateral benefit.
3.	Mosquito repellent cream.	For use by individual during journey. Can be used in the evening before sleeping under the Mosquito bednet.	i) Suitable for use by an individual. ii) Action lasts for a short time. Repeat application is required during the night. iii) Some individuals may experience adverse reaction due to skin sensitivity. iv) Rate of acceptance is low because repeated applications are required every night. v) Some individuals do not like greasy material on their skin.
4.	Impregnated coils/ pellets	For use by individual or a group of people sleeping indoors.	i) Most effective in confined sleeping area. ii) Efficacy is adversely / effected by direct air current. iii) If used in all rooms of the house from dusk onwards, usual household activity can be carried out by family members with very little exposure to mosquito bites. iv) efficacy differs from one product to another and is estimated at 60 to 80% protection only. v) Impregnated coils and pellets are costly. vi) Effect of long term exposure to chemical vapour used in coils, etc. has not been studied.

MODEL CIVIC BY-LAWS IN URBAN AREAS

For management of domestic and extra-domestic mosquito breeding places, adoption and enforcement of by-laws for use under Urban Malaria Scheme are framed as under:

Control of malaria and other mosquito borne diseases

Draft provisions suggested for adoption under appropriate section/rule prevailing in the State

Application of this Provision

1. The State Govt./local authority constituted under any act may enforce the following provisions to the whole or any part of the State/local authority area.

2. (I) If the provisions have been extended, no person or local authority shall, after such extension

(a) have, keep, or maintain within such area any collection of standing or flowing water in which mosquitoes breed or are likely to breed, or

(b) cause, permit, or suffer any water within such area to form a collection in which mosquitoes breed or are likely to breed, unless such collection has been so treated as effectively to prevent such breeding.

(II) The natural presence of mosquito larvae, in any standing or flowing water shall be an evidence that mosquitoes are breeding in such water.

Treatment of Mosquito Breeding Places

3. (I) The Health Officer may, by notice in writing, require the owner or the occupier of any place containing any collection of standing or flowing water in which mosquitoes breed or likely to breed, within such time as may be specified in the notice, not being less than 24 hours, to take such measures with respect to the same, or to treat the same by such physical, chemical or biological method, being measures or a method, as the Health Officer may consider suitable in the circumstances.

(II) If a notice under sub-section (I) is served on the occupier, he shall in the absence of a contract expressed or implied, to the contrary, be entitled to recover from the owner the reasonable expenses incurred by him in taking the measures or adopting the method of treatment, specified in the notice and may deduct the amount of such expenses from the rent which is then or which may thereafter be, due from him to the owner.

Health Officer's Power in Case of Default

4. If the person on whom a notice is served under provision 3 fails or refuses to take the measures, or adopt the method of treatment, specified in such notice within the time specified therein, the Health Officer may himself take such measures or adopt such treatment, specified in such notice within the time specified therein, and recover the cost of doing so from the owner or occupier of the property, as the case may be, in the same manner as if it were a property tax.

Protection of Antimosquito Works

5. Where, with the object of preventing breeding of mosquitoes in any land or building, the Govt. or any local authority or the occupier at the instance of the Govt. or

local authority, (have constituted any works) in such land or building, the owner for the time being as well as the occupier for the time such land or building shall prevent its being used in any manner which causes or is likely to cause the deterioration of such works, or which impairs, or is likely to impair the efficiency.

Prohibition of Interference with such Works

6. (I) No person shall, without the consent of the Health Officer, interfere with, injure, destroy, or render useless, any work executed or any material or thing placed in, under or upon any land or building, by the orders of the Health Officer with the object of preventing the breeding of mosquitoes therein

(II) If the provisions of sub-section(I) are contravened by any person, the Health Officer may re-execute the work or replace the materials or things, as the case may be, and the cost of doing so shall be recovered from such person in the same manner as if it were a property tax.

Section in Respect of Household Cans and other Containers

7. The owner or occupier of any house, building, or shed or land shall not therein keep any bottle, vessel, can or any other container, broken or unbroken, in such manner that it is likely to collect and retain water which may breed mosquitoes.

8. All borrow pits required to be dug in the course of construction and repair of roads, railways, embankments, etc. shall be so cut as to ensure that water does not remain stagnant in them. Where possible and practicable the borrow pits shall be left clean and sharp edged and extra expenditure not exceeding 1 per cent of the cost of the earth work in any project may be incurred to achieve this. The bed

level of borrow pits shall be so graded and profiled that water will drain off by drainage channels connecting one pit with the other till the nearest natural drainage nullah is met with. No person shall create any isolated borrow pit which is likely to cause accumulation of water which may breed mosquitoes.

9. In case of any dispute or difference of opinion in the execution of any antimosquito scheme or in its operation or any work under these provisions in which the jurisdiction of the Govt. of India, or Govt. of any other State is involved, the matter shall be referred to the Govt. of India for final say in the matter.

10. Powers of Health Staff to enter and inspect the premises

For the purpose of enforcing the provisions, the Health Officer or any of his subordinate not below the rank of Health or Sanitary Inspector may, at all reasonable times, after giving such notice in writing as may appear to him reasonable, enter and inspect any land or building within his jurisdiction and the occupier or the owner as the case may be, of such land or building, shall give all facilities necessary for such entry and inspection, and supply all such information as may be required of him for the purpose aforesaid.

IEC STRATEGY FOR MALARIA ACTION PROGRAMME

Introduction

Health Education is a part of the success of any Health Programme. Information, Education and Communication (IEC) play an important role in bringing down the disease to a low level. In terms of Malaria, Health Education serves two purposes(i) to inculcate individual/ community protective & preventive habits as a part of malaria control measure within a given socio-economic & environmental context and (ii) to generate a demand for appropriate services from the health delivery system.

In the changing circumstances of epidemiology of diseases, and the environment, a broad strategy for Health Education activity is given below :

General Objective

To create awareness among the members of the community about the causes, prevention, treatment and management of malaria cases leading to the reduction in the mortality and morbidity (mortality-nil and morbidity 0.5 cases per 1,000 population per annum)

Specific Objectives

i). To create awareness on the reduction in the frequency of the contact between man and mosquito.

ii). To create awareness among the masses regarding methods which bring about reduction in the parasite load in the community.

iii). To create awareness on the methods which can bring about reduction in the mosquitogenic conditions leading to the lowering of the mosquito density in the area.

The following strategy is suggested :

Strategy

i). **Provider** - Faculty of Regional Family Welfare Training Centres and State Health Education Bureaux

ii). **Receiver** - School children, Housewives, Mahila Mandals, Villagers, Small factory workers & different members of community.

- The involvement of community opinion and non- formal leaders will be of paramount importance in spread of awareness on malaria in community and in obtaining their co-operation in implementation and acceptance of control activities.

Media - Mix

i). **Mass Media** : Through electronic media like T.V., Radio, Video quickies, Video on wheels & Cables

ii). **Print Media** - Posters, folders, hand bills, charts, flip charts, flip booklets, stickers, book markers for school children, postal prints, etc.

iii). **Other Media**- Through Exhibition, Folk dance, Puppet show, Drama, Bhajan, Kirtan, Prabhat fary, etc.

Responsibilities

i). **Central level**

- Press release.
- Release of Malaria books
- Holding of Seminars
- Panel discussions on AIR & TV

ii). **State level**

The same activities mentioned above will be carried out at State level.

iii). **Peripheral level**

- Poster competition, essay competition
- Organisation of exhibition at school level
- Hoardings and banners at Melas (Carnivals)
- Clay models depicting life cycle of Malaria parasite, Malaria vector, DDT spray, treatment, etc.
- Observation of ' Malaria Week' form 1st May to 7th May every year throughout the country for creating awareness among masses and seeking community participation. (The guidelines for observing 'Malaria Week' are given in Annex-8)

OBSERVATION OF 'MALARIA WEEK' GUIDELINES

Introduction

The recent resurgence of malaria in many parts of the country necessitated the need to strengthen the health promotion component of the programme. Therefore, it has been decided to observe 'Malaria Week' before the onset of monsoon. The main objective is to create awareness among the masses about this man-made disease (malaria) and its prevention. The health education is an integral part of the success of every public health programme. The success of the programme depends upon the community participation. With the above objective in mind the Directorate of NMEP formulated guidelines for malaria week for mass participation in the programme.

Malaria Week:

1st May to 7th May every year has been earmarked as the observation of 'Malaria Week' throughout the country. These days have been chosen because it is the pre-monsoon period and the transmission of malaria starts around this period in most parts of the country.

Broad Guidelines

Implementing Agencies:

1. NMEP Headquarters, Delhi in collaboration with CHEB.

Nodal Officer i/c IEC, NMEP.

2. State Health Directorate through: (a) State Health Education Bureau (b) NGOs.

Nodal Officer - State Programme Officer.

3. Regional Directors of each State/Region.

The Main Activities:

1. At Central Level

- Press release
- Messages from Prime Minister,Health Minister, etc.
- Holding of Seminars, Panel discussions.
- Release to Press, TV and Radio
- Discussions on TV and Radio.
- Holding Exhibition on Malaria and other vector borne diseases.

2. **At State Hqs. Level**

- The above activities should be carried out at State level in similar manner.
- Mobilisation of State Health Education Bureau for helping the peripheral agencies.
- Encourage the NGOs to observe the week.

3. **Peripheral Level**

a) **In Health Institutions:**

i) **Medical Colleges**- Lecture-discussion amongst teachers and students (through PSM Deptt. and students).

ii) **Distt. Hqs. Hospitals**:

- Establishment of case detection cum treatment camp, Fever treatment, examination of blood.
- Display of Posters and Banners.

iii) **At PHC Level:**

- Special camps.

Organisation of meetings with village leaders and impressing about the prevention of malaria.

- Display of Posters and Banners.

- Organising group discussions.

b) **In Schools:**

- Poster competition : Organisation of exhibition.

- Essay competition.

c) **In Block/Taluk Level**

- Organisation of camps of opinion leaders.

- Meeting with Mahila Samitis and Youth Clubs.

- Youth Clubs may organise street plays or puppet shows.

A detailed report of observation of 'Malaria Week' should be submitted to the Dte.of NMEP after the week is over.

TRAINING NEEDS FOR MALARIA ACTION PROGRAMME DURING 1995-2000

1. INTRODUCTION

The Malaria Action Programme (MAP) requires to deploy a large band of workers at different tiers for the implementation of control activities. Proper training in developing job skills is a prerequisite for successful implementation of control strategy. Training should not only inculcate upgrading technical skills but also imbibe positive motivation among field staff for developing high degree of discipline, diligence and dedication in discharging their duties and responsibilities. It is obvious that when a training schedule is properly planned in respect of content, time and method of implementation, it will help in acquiring requisite technical skills and performance of functions more efficiently. The training should be an on going programme with an inbuilt provision to update knowledge and skills in the light of progress made in science and technology in the control of vector borne diseases and training opens new vistas in the technical advancement to achieve the goal of '**Freedom from Malaria**'.

2. PROGRESS OF TRAINING SINCE THE EARLY PHASE OF NMEP

Training of professionals and ancillary personnel was one of the major objectives when the National Malaria Eradication Programme was launched in 1958. To realize this objective, the training activities were augmented at the then Malaria Institute of India (presently NICD). Six Region-

al Co-ordinating Organizations were established in the country under the Dte. of NMEP which were continuously engaged in training different tiers of professionals and paramedicals. Simultaneously the States also strengthened their training centres to meet the challenging task. With the near eradication achieved in 1965, the training programmes in malaria control were relegated to the back-seat, getting a very low priority in many States. In the subsequent years, most of the early trainers superannuated who could not be replaced with the younger talent. Thus, the malaria training programme suffered both in the availability of manpower and monetary support.

The money invested in the national health programme could be judiciously utilized with maximum cost-effectiveness through the trained manpower. A new malaria action programme is in the anvil in consequence to the recommendations of the Expert Committee on Malaria and the country should equip the manpower with the new technical skills and strategy. The small money that is invested in the training is expected to reap high dividends in achieving the goal of Alma Ata declaration at an accelerated pace.

3. PRESENT TRAINING NEEDS

Training is required from the grassroots level worker to the programme officer. The magnitude of training required at different levels is given as under :

3.1 VOLUNTARY LINK WORKERS, FTD AND DDC HOLDERS

The present strategy of Malaria Action Programme envisages full co-operation and participation of the community for successful implementation of control measures. A Voluntary Link Worker hailing from the local community is to be deployed in hardcore areas. With the decentralization of malaria control, the revival of Drug Distribution

Centres (DDCs) and Fever Treatment Depots (FTDs) and establishment of new ones are planned for early case detection and prompt treatment (EDPT) to prevent mortality due to malaria and drastically reduce morbidity. It is estimated that about 7,50,000 workers are to be imparted one day training in the respective Primary Health Centres on the basic aspects for community participation/co-operation in spray, early case detection of fever and blood smear collection, prompt treatment with full dose of antimalarials, personal and community protection measures, referral of seriously ill cases, etc. The medium of instruction shall be the local language. Each batch may comprise of about 30 members and thus 25,000 batches are to be trained, spread in five years, giving priority to highly endemic PHCs at the first instance. In those PHCs where class room facilities are not available, school premises could be utilized for training during weekends.

3.2 MULTIPURPOSE WORKERS

Multipurpose Worker is the grassroots level government functionary who shall require professional skills in IEC, supervision in the indoor residual spray operations, early case detection and treatment of malaria cases promptly, refer complicated cases to the referral centres and keep vigil whether ***Plasmodium falciparum*** infection is amenable to Chloroquine. It is planned to impart two days training at the respective PHCs on the requisite skills. There are 1,50,000 MPWs in the country. Each batch of trainees may comprise of 25 MPWs and 6,000 batches in 5 years @ 1200 batches per year are to be trained. The training period could be matched with the periodic visits of MPWs to PHC.

3.3 MALARIA OR HEALTH INSPECTORS / SUPERVISORY STAFF.

One supervisor earmarked for malaria control activities in each of the PHCs is to be trained for two weeks on the

planning, implementation, concurrent and consecutive supervision of spray operations, examination of backlog blood smears during non-spray period, monitoring of detection and treatment of malaria cases, logistics, evaluation, etc. at one of the training centres such as ROH&FW, RFWTC, Cental Malaria Laboratory, Zonal Training Centres, etc. In total, 1000 batches in five years @ 200 batches per year and each batch having 25 participants are to be trained.

3.4 LABORATORY TECHNICIANS/MICROSCOPISTS

One Laboratory Technician involved in malaria work in each PHC will be imparted four weeks practical training on blood smear collection, processing, staining, stain preparation, differential diagnosis,. etc. at the well equipped training centres like the one already mentioned for malaria inspector. In total 1000 batches in five years @ 200 batches per year and each batch having 25 trainees are to be imparted training.

3.5 MEDICAL OFFICERS OF PRIMARY HEALTH CENTRES.

Medical Officer of PHC plays a pivotal role in the implementation of the programme. In the decentralized strategy the MO is responsible and accountable for proper implementation and monitoring of the programme. He is to be acquainted with the roles and responsibilities in the supervision of early diagnosis and treatment, anti-mosquito measures, intersectoral co-ordination, community participation, training of grassroots level workers, etc. It is proposed to impart 5 day training at one of the training centres mentioned under Inspector and Technician. It is suggested that the training may be given from Monday to Friday. In all, 1000 batches in five years @ 200 batches per year are to be trained and each batch may have an average of about 25 participants.

3.6 DISTRICT LEVEL OFFICERS LIKE DMO/ DY. CMO, ETC.

The district officers are to plan, manage, monitor and evaluate the programme in the entire district. They are to be imparted training on principles of planning, modern management techniques, intersectoral co-ordination, IEC, MIS, epidemiology, containment of epidemics, field operational research, training, etc. It is proposed to impart four weeks training to four district officers in each district at premier institutions like the National Institute of Communicable Diseases, Delhi, MRC, RMRCs and other training centres under ICMR, Institute of Vector Control and Zoonosis, Hosur (Tamil Nadu) and some selected medical colleges and bio-medical research institutions. In total 1875 officials are to be trained in 75 batches in five years @ 15 batches per year.

3.7 ZONAL ENTOMOLOGISTS / BIOLOGISTS INCHARGE OF UMS / NFCP.

Zonal Entomologists/Biologists have to perform very specialized duties in their respective fields. There are about 500 professionals under these cadres in the country. They will be imparted training similar to district level officers but special emphasis will be given on entomological techniques, dynamics of transmission, etc. The training will be for four weeks. The type of training institutions are similar to those mentioned under District level Officers. Every year four batches are to be trained.

3.8 TRAINERS' TRAINING

The trainers in the training institutes need to be acquainted with the basic tenets of pedagogy. They should update their knowledge and skills through continuous education and exposure. It may neither be feasible to employ large number of faculty specially for training alone nor pos-

sible to develop versatile expertise among the limited members of permanent faculty at the training centres. It is prudent to supplement the training needs by deploying guest faculty possessing expertise in the specialized fields from outside the programme. It is very advantageous to locate the training centres near medical colleges/research institutions/ other training institutions to induct the guest lecturers from such organisations. The identified faculty within and outside the health sector requires to be acquainted with the demands of the Malaria Action Programme. It is proposed to hold two trainers' training workshops for five days duration each at NICD/NMEP per year to train 50 to 60 trainers every year.

3.9 INTERSECTORAL TRAINING

Any talk on intersectoral co-ordination will be a futile exercise unless the professionals within and outside the health sector are imparted training to highlight that their nature of job may impinge on the environment in the proliferation of vector borne diseases.

Training and education on vector borne diseases and the bio-environmental control measures shall be imparted to engineers and other officers in-charge of developmental projects, public works, irrigation, water resources, forestry, environment, fisheries, railways, agriculture, mining, communication, etc. through specially designed workshops, brochures and manuals. It is proposed to hold one workshop every year in bigger States and one workshop in five years in smaller States/Union Territories. The workshops shall be for three days with the second day for field visit to developmental project areas to study mosquitogenic conditions and undertaking naturalistic or integrated methods of control. A few workshops have already been conducted by the Dte. of NMEP in Maharashtra, Karnataka, Gujarat, Rajasthan and UP. The outcome of the workshops has

been very encouraging. Twenty workshops are proposed to be conducted every year.

4. INSTITUTIONAL STRENGTHENING OF TRAINING CENTRES

The basic prerequisites of a training centre are the location of the centre in an ideal environment with infrastructure facilities like adequate space, ideal class room fitted with modern teaching aids, well equipped laboratory, insectary, animal house for experimental malaria, a computer for information storage and retrieval system, library with full spectrum of books, periodicals and scientific journals on malaria and other vector borne diseases, adequate transport facility for field visit, a good hostel for boarding and lodging for participants and visiting faculty and above all a highly proficient team of trained teachers.

The operational research should be an integral part of the training centres to gain first-hand information on different aspects of malaria and other vector borne diseases, to evaluate skills through experimentation and also to record any change in the approach that may be warranted from time to time. The research activities confer unique opportunities to augment the technical skills of trainers who in turn transmit the same to trainees. The technical problems faced by the field staff could be taken up by the training centres to evolve solution through field studies. The operational research should include feasibility studies on alternative methods of control, different diagnostic techniques, screening methods, chemotherapeutic trials, evaluation techniques, IEC activities for community participation, cost effective analysis, human behaviouristic patterns, etc.

Though many of the premier training centres in the country do possess infrastructure facilities for the above cited activities, they need strengthening to meet the training needs.

5. CURRICULUM

The training curriculum differs for different categories of field staff taking into consideration the nature of their roles and responsibilities. The topics need to be updated due to periodic changes made in the strategy of control on account of rapid technological strides. The curriculum for the top echelons should include subjects inculcating sound knowledge and perception in the managerial skills, planning, budgeting, logistics, financial and administrative rules, evaluation of programme, latest knowledge on different control methodologies, biology of vectors as well as parasite, etc. The curriculum should be balanced properly for each tier of workers covering vast array of instructional material and methods through lecture-discussions, practical-demonstrations, field exercises, films, slides, charts, models, books, programmed lecture notes, group and panel discussions. The stereotyped notes and monotonous lectures are to be replaced by the modern teaching methods. The skills produced through the training programmes should be upgraded and utility based. The skills produced once are to be constantly updated through continuous interaction between the trained workers and training institutions.

There is a need to have consultants having expertise in medical sciences, experienced in medical entomology and control methodology. These consultants will be able to assist in developing different training modules and carrying out pilot training courses with the newly developed strategy and methodology.

6. PROBLEMS IN THE TRAINING PROGRAMMES WHICH NEED STREAMLINING

The major bottlenecks in the training are listed below:

The States and other sponsoring organizations may ensure that the benefits of training are fully utilized by the professionals and paramedicals.

i) Though large number of personnel were trained during the last three-and-a-half decades, paradoxically majority of the field staff presently employed are either untrained or trained more than a decade back. The States/UTs and other sponsoring organizations must not only ensure that sufficient participants are sponsored but also oversee that such sponsored candidates must not evade the specific training.

ii) The training centres should draw advance calendar of training activities and inform all the organizations to enable them in sponsoring sufficient number of participants. The training capacity of the centres should be fully utilized.

iii) Many sponsored candidates do not turn up for training because of meagre daily allowance which may be inadequate to meet the actual expenses. The stipend should be sufficient for the participants to meet the expenditure.

iv) There has been heavy turn-over of trained staff who are often posted after training to other sectors of health. Some health staff do try to avoid malaria work due to arduous nature of job, requiring prolonged stay in the field. The lack of promotional avenues and monetary incentives drive them away in search of better pastures in other sectors. The endemic States should ensure that malaria work attracts talented personnel by improving the service conditions, wherever needed.

v) Due to communication gap, some of the participants join the training course a few days after the commencement or some may leave the training in the midst of training due to some personal problem or the other. Sufficient disincentives should be incorporated to reduce this anomaly. Advance information regarding dates of training is expected to fill the communication gap.

vi) The trained staff should be retained in malaria work for a specific duration which must be made mandatory, lest the Herculean efforts made in the training should go waste.

Annex- 10

INVESTIGATION REPORT ON DEATH DUE TO MALARIA

The investigation should be carried out by District Malaria Officer, Assistant Malaria Officer or Medical Officer PHC only. Any investigation carried out by a person below these ranks will not be valid.

1. **Basic information**

1.1. Date of Death_____

Time of Death_____

1.2. Name and Surname of the deceased:_____

_____

1.3. Age 1.4. Sex

(In adult female, indicate status of pregnancy and its complications, if any)

1.5. Address (usual place of residence)

Head of the family

House No.: Street:

Village/Town:

District: State:

1.6. Occupation of the deceased:

2. **Case history of illness:**

2.1. Source of information:

- Relatives (specify relationship):
- Paramedical staff (specify by designation) :
- Treating Physician (specify by qualifications) :
- Any other (specify):

2.2. **Date and hour of onset of illness:**

2.2.1. Total days of illness:

2.3. Sign and symptoms at the time of onset of the illness :

Fever intermittent/Fever continuous/Rigor/Headache/ Diarrhoea/Vomiting/Blood in Stools/Suppression of urination

/Abnormal behaviour/Convulsions/Blurring of Vision/Unconsciousness

(Tick mark those present)

Others(specify).....

2.4. Place where disease started:

a). Usual place of residence Yes/No

b). If no, give address

2.5. History of movement/specify halting station(s) preceding 3 weeks from the date of onset of illness

a). date of departure from residence

b). during first week

c). during second week

d). during third week

2.6. Referred to Hospital/PHC/Dispensary Yes/No

(Tick mark institute where referred)

2.6.1. Referred or advised by - Self/family member/MPW/ VLW / FTD/DDC/Private Practitioner

(Tick mark whichever is applicable)

2.6.2. Date of reference:_____

2.6.3. Name of the Medical Institution_____

_____

2.6.4. Date of consultation with Private Practitioner(s)

2.6.5. Name and qualification of the Private Practitioner(s)

2.6.6. Treatment/investigation/advised by Private Practitioner(s)

3. Parasitological Investigation and treatment.

3.1. Blood smear examination and treatment before Hospital admission.

3.1.1. Date of Blood Slide collection

3.1.2. Date of presumptive treatment given.

Name of Drug Dose

1.

2.

3.1.3. Blood Slide collected by: FTD/MPW/ Lab.Technician / Supervisor or others (specify)

.....

.....

3.1.4. Date of blood slide examination:

3.1.5. Name of the laboratory where examined

3.1.6. Name of the Technician

3.1.7. Result: Species: Stage: Density:*

3.1.8. Date of communication of results to periphery:

3.1.9. Radical treatment, if any.

Date(s)	Drugs	Dosages

3.2. **Parasitological investigations and treatment after admission to hospital:**

3.2.1. FOR EACH BLOOD SMEAR COLLECTED

Sl.No.	Collection		Examination		Results			
	Date	Time	Date	Time	Positive	Species	Stage	Density *
1								
2								
3								
4								

FOR EACH BLOOD SMEAR RE-EXAMINED

Sl.No.	Collection		Examination		Results			
	Date	Time	Date	Time	Positive	Species	Stage	Density *
1								
2								
3								
4								

* per 100 fields of thick smear

3.2.2. Other Biochemical/Pathological investigations done (specify)

3.2.3. History of case on admission to Hospital

3.2.4. Source of information: Treating physician/Case History sheet.

3.2.5. Date of Referral..... and by whom .....

3.2.6. Date and time of admission:

3.2.7. Name of treating Physician(s) and qualifications.

1.

2.

3.2.8. Date and time of first examination by Physician

3.2.9. Sign/Symptoms observed/recorded in case sheet.

Rigor/Fever intermittent/Fever continuous/Headache/ Diarrhoea/blood in stools/vomiting/suppression of urination/abnormal behaviour/convulsions/Blurring of Vision/ unconsciousness/any other (specify)

3.2.10. Tentative Diagnosis.

3.2.11. Confirmation of Diagnosis - by microscopy (vide item No. 3.2.1).
Date: **Time:**

3.2.12. Clinical progress of the case

Treatment

(a). Antimalarials

Date	Drug	Dose	Route of administration
1.			
2.			
3.			

(b). Other supportive treatment.

Date	Drug	Dose
1.		
2.		
3.		

3.2.13. Evaluation of clinical progress (date-wise)

---

4. Death Date Time

4.1 Cause of Death in microscopically confirmed cases of malaria (Use international certificate proforma)

1.
2.
3.

4.2 Cause of death in clinically suspected case of malaria

a). Sign/symptoms present in the deceased	During differential diagnosis following were excluded:-
- coma	Diabetes, head injury, hepatic, any other conditions
- hyperpyrexia	Heat stroke, viral infection and septicaemia due to U.T. infection, etc.
- convulsions	Other conditions
- shock/collapse	Other causes of shock and collapse
- pregnancy/abortion with pyrexia	Spontaneous/induced/foetal or other abnormalities
- pulmonary oedema	Cardiac/respiratory tract conditions
- haemoglubinuria/ oliguria	Kidney, bladder lesions Kidney dysfunction due to other diseases
- diarrhoea/dysentery	Acute intestinal infection, cholera, gastroenteritis, bacterial dysentery.

- The death on clinical grounds can be suspected if:

b). ***P.falciparum*** is predominant infection in the locality.

c). Or the case had acquired infection in ***P.falciparum*** predominant area as ascertained by history of movement at ..... (name of place)

Exception - If the locality/area does not have *P.falciparum* focus as confirmed during implementation of remedial measures or *P.falciparum* infection is not encountered in contact & mass survey cases, the death should not be labelled as death due to malaria on clinical grounds only.

5. **Postmortem details, if undertaken.**

6. **Remedial Measures undertaken:**

Period from_____to_____

Place : (a) where patient had fallen sick

(b) Where patient might have contracted infection

(c) both (Tick any one)

6.1. 1. Contact Survey : Date:
Number of blood smears collected:
Number of blood smears examined:
Number of blood smears positive:
Results : species: *Pf* *Pv* *Pm* Mixed

6.2. Mass Survey: Date:
Number of blood smears collected:
Number of blood smears examined:
Number of blood smears positive:
Results : species: *Pf* *Pv* *Pm* Mixed

6.3. Focal spray (specify)

6.4. Mass drug therapy (specify) population and coverage

6.5. Any other measures (specify)

Name and Signature of Investigator.

Designation:_____

Date of investigation:_____

KEY FOR FILLING INVESTIGATION REPORT ON DEATH DUE TO MALARIA

The investigation report in case of death on account of malaria infection is necessary to confirm the epidemiological factors and operational failures resulting in the death of patient due to this disease.

It may be clearly understood by the investigating officer that:-

1. In case of infection with ***P.vivax*** and ***P.malariae,*** death does not occur as a direct consequence of infection with malaria parasite.

2. Only in case of ***P.falciparum***, death occurs as a consequence of malaria infection, because of the pathological changes produced by the parasite in the human body.

3. The pathological changes noticed in ***P.falciparum*** are preventable and reversible, if treatment with appropriate antimalarials is administered in time.

4. Therefore, unless the deceased was found positive for ***P.falciparum*** infection, a case should not be labelled as death due to malaria.

5. However, in case of epidemic with predominance of ***P.falciparum*** infection in the community, if the blood smear of a death case could not be examined, the circumstantial evidence from sign and symptoms may indicate that the patient might have died due to ***P.falciparum*** infection, or the death has occurred because treatment with antimalarials was started too late.

Therefore, the proforma entitled "Investigation report on death due to malaria" was introduced under NMEP/PfCP.

However, it has been observed that such reports are not being sent regularly from the periphery in spite of repeated instructions on the subject.

Further important points to be observed during the investigation are:-

1.1. The investigation report on death due to malaria should reach all concerned within 7 days of the completion of investigation.

1.2. The investigation should be carried out by the District Malaria Officer/Assistant Malaria Officer, Medical Officer of the PHC or an officer of similar rank and qualifications. Any investigation carried out by any other officer below these ranks will not be valid.

2. Most of the items on page-1 of the proforma under basic information are self explanatory. If the illness has started at some place other than usual place of residence under item 2.4, the history of movement should start from the usual place of residence of the patient terminating at the place where the patient became sick for the first time, this address is to be recorded against 2.4 (b) and movement traced back to usual place of residence. The history of movement is given along with halting stations. In case the patient dies at his usual home, it is still necessary to record history of movement during last three weeks to pinpoint the place where infection was acquired.

It is necessary to indicate whether he has been seen by a Medical practitioner as given under item 2.6.4 and 2.6.5. If death occurs in a Medical Institution, then date of reference to the Institute under 2.6.2 is entered.

3. Under item 3.1.8 and 3.1.9, there is a mention of date of communication of result to the periphery and radical treatment,

if any. Normally it is not expected that a person would die or develop serious complications after having received full antimalarial treatment along with radical treatment with primaquine. But in a very rare case, if this has occurred, it is essential to understand the sequence of events. Therefore, date of collection of blood smear, examination, presumptive treatment and radical treatment are necessary and they should be filled by the investigator after fully satisfying himself with the accuracy of information.

4. Under item 3.2.13, evaluation of clinical progress datewise is to be given for the entire period of stay in the hospital. Usually these remarks are given in the case sheet by the physician treating the case. They should be copied verbatim in this proforma.

5. Under item 6, remedial measures undertaken, the investigator would look into the records of the District Malaria Officer or PHC Medical Officer to find out what remedial measures were implemented in the place where the person had fallen sick, or in the area where on the basis of epidemiological investigation, he might have contracted the malaria infection. If remedial actions were taken in both areas, details as given under item 6, should be entered in respect of both the places.

STATE.....

NATIONAL MALARIA ERADICATION PROGRAMME

CONFIRMED DEATHS DUE TO MALARIA FOR THE MONTH OF .....

Sl. No.	Name of the District	Name and Address of the deceased	Age	Sex	Date of Collection of B.S.	Date of Examination of B.S.	Species	Period of R.T.	If hospitalised, date of admission	Date expired on

Epidemiological Parameters in Malaria Eradication Programme

1. Annual Blood Smear Examination Rate (ABER)

Calculation formula

$$\frac{\text{Number of blood smears examined in a year}}{\text{Total population}} \times 100$$

Epidemiological significance

This pararmeter reflects the efficiency and adequacy of case detection mechanism. A minimum ABER of 10% per year was fixed under the Malaria Eradication Programme based on estimates of fever rate in India. It was laid down that the ABER should not be less than 1% per month during the transmission period.

2. Annual Parasite Incidence (API)

Calculation formula

$$\frac{\text{Total No. of blood smears positive for malaria parasite in a year}}{\text{Total population}} \times 1000$$

Epidemiological Significance

This parameter depends upon the adequacy of case detection mechanism i.e, ABER. If ABER is adequate, this parameter is the most important criterion to assess the progress of eradication programme and was used for entry of areas into

advance phases of eradication campaign i.e. Consolidation and Maintenance.

At present this parameter i.e., API is used under the MPO for determining the areas to be brought under spray operations.

3. Annual falciparum Incidence (AfI)
Calculation formula

$$\frac{\text{Total No. of blood smears positive for } \textit{P. falciparum} \text{ in a year}}{\text{Total population}} \times 1000$$

This is expressed as the proportion of total number of blood smears found positive for ***P. falciparum*** infection in the total population under malaria surveillance.

4. Slide Positivity Rate (SPR)
Calculation formula

$$\frac{\text{Total No. of blood smears found positive for malaria parasite}}{\text{Total No. of blood smears examined}} \times 100$$

Epidemiological significance

This parameter is less dependent on case detection mechanism (ABER). Whenever the case detection mechanism is inadequate, this is a dependable parameter for determining the progress of containment measures and gives information of parasitic load in the community. It is more reliable than API even for areas where ABER fluctuates from year to year.

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5. Slide falciparum Rate (SfR)
Calculation Formula

$$\frac{\text{Total No. of blood smears found Positive for } \textit{P. falciparum}}{\text{Total No. of blood smears examined.}} \times 100$$

Epidemiological Significance.

This parameter also depends less on the case detection mechanism in space and time. If such a mechanism is adequate, it pinpoints areas of *P. falciparum* preponderance and indicates the necessity for intensification of intervention measures on priority basis to control *Plasmodium falciparum* infection which is responsible for malaria mortality in India.

6. *P. falciparum* Percentage (Pf %)
Calculation Formula

$$\frac{\text{Total No. of blood smears found positive for } \textit{P. falciparum}}{\text{Total No. of blood smears positive for malaria parasite.}} \times 100$$

Epidemiological Significance

This parameter gives the relative proportion of *P. falciparum* infection and identifies trends of *P. falciparum* incidence in relation to total case load of malaria parasite in the community.

Entomological Parameters in Malaria Eradication Programme.

1. Adult vector density

Man hour hand captures: (per man hour density)

$$\frac{\text{No. of mosquitoes collected}}{\text{No. of man hours spent in search}}$$

Significance

High vector density indicates high potential for malaria transmission. Data on longitudinal studies on vector densities indicate seasonal (weekly/monthly/annual) trend of vector prevalence; its disease transmission association/potential ; vector behaviour (resting indoors/outdoors) and impact of anti-vector measures. But some vectors like *An. minimus* and *An. fluviatilis* can transmit even in very low densities.

1.2 Total pyrethrum spray catch density expressed as total catch per hut.

Significance

An auxiliary method for determining vector prevalence in areas of low indoor resting vector densities as well as where indoor habitats provide hiding places not detected through hand capture method.

2. Gravid / Non-gravid Ratio

Classification of captured adult females on the basis of abdominal condition.

Significance

Detection of high gravid ratio is a sensitive index for early detection of the failure of impact of anti - adult measures.

3. 24 hours survival rate

Holding adult female vectors hand captured as well as captured in window cage exit traps, for detection of survival/ mortality within 24 hours.

Significance

An indicator of impact of exposure to residual insecticide besides indicating inherent population characteristics of daily mortality.

4. Man - Mosquito Contact

Human bait: per bait, per night, per unit time.

Human baited trap: per trap, per night, per unit time.

Significance

Indicates differential man feeding propensity, man biting rate of mosquitoes, site of vector - man contact and changes, if any, consequent to indoor residual insecticidal spray .

5. Sporozoite rate (per cent)

$$\text{Sporozoite rate (for each species)} = \frac{\text{No. of females positive for sporozoites}}{\text{No. dissected}} \times 100$$

Significance

Incriminates the mosquito species as malaria vector. An indicator of the efficiency of species in malaria transmission in time and space.

6. Residual efficacy of insecticides

6.1	Wall cage test (contact bio-assay test)	24 hour % mortality among susceptible msoquitoes exposed to insecticide sprayed surface for 15 minutes.

Signficance

To determine the efficacy and duration of residual action of the insecticide sprayed indoors.

6.2 Test of wall scrapping

Test of sprayed wall surface of which 25 sq. cm area to a depth of 1.3 mm is scrapped and tested for presence of insecticide sprayed.

Significance

Indicator of quantity of insecticide present on sprayed surface at a given point of time, can be used to determine quality of spray in conjunction with other parameters.

7. Vector susceptibility to insecticides
Busvine and Nash (1953) technique.

Significance

To determine susceptibility status of vector to insecticide in use as well as selection of alternative insecticide.

MPO envisages intensification of regular data collection on entomological parameters mentioned under NMEP and inclusion of additional parameters/methods of data collection as under: -

1. Larval Density

Per dip captures: (ladle, net, well net, others) = $\frac{\text{No. of larvae collected}}{\text{No. of dips made}}$

Significance

Indicator of efficiency of larval control measures (Urban areas) as well as an auxiliary method for detection of vector prevalence/ potential in time and space.

2. **Parity rate:**

Detionva technique

$$\text{Simple detection of parous females} = \frac{\text{No. parous}}{\text{No. dissected}} \times 100$$

Polovodova technique

$$\text{Physiological age of vector females} = \frac{\text{No. oviposited once, twice, thrice, so on, based on No. of dilatations.}}{\text{No. dissected.}} \times 100$$

Significance

Test of detection of vector longevity to indicate

a) Impact of anti-vector measures
b) Vector potential over time and space
c) Vector population structure

3 Man - Mosquito Contact

3.1 Human bait/ animal bait — per bait, per night, per unit time

3.2 Serological testing of mosquito blood meals

(precipitin test/ gel diffusion technique)

$$\frac{\text{No. positive for human blood}}{\text{No. blood meals tested}} \times 100$$

Significance

Detection of indoor / oudoor differential man bitting propensity, Man Biting Rate (MBR), Anthropophilic/ Zoophilic indices, deviations in feeding behaviour.

4. **Outdoor adult density**

Induction of outdoor trapping devices - Pit shelters / other shelters.

Significance

Indication of exophily and scatter of vector population in space and time.

5. Vector susceptibility to insecticide

5.1 Use of WHO - adult/ larval test kits

5.2 Aereal bio-assay

Significance

a) To obtain comparable data on vector susceptibility to insecticide.

b) To detect the impact of fumigant action or air borne effect of indoor residual spray as well as space spray insecticides.

METHODOLOGY FOR SELECTION OF 'HIGH RISK AREAS' ON THE BASIS OF CRITERIA LAID DOWN BY EXPERT COMMITTEE : EXAMPLE - STATE OF ASSAM

Annex-12

S.No.	Name of District	Name of PHC	Population (in 000)	Year	ABER (%)	SPR (%)	Pf.%	Death	Qualify as 'high risk areas' under criterion
1	Dhubri	Dharamsala		1991	6.81	1.35	72.79	1	Qualifies under criterion No.1 i.e. deaths due to malaria in any of the last three years.
				1992	7.22	1.11	58.33	3	
			315	1993	9.55	0.87	53.40	2	
		Raniganj	-	1991	5.88	6.34	86.14	-	Qualifies under criterion No.3 - Average SPR for the last three years is 5 or more.
				1992	6.66	5.99	89.34	-	
			295	1993	7.90	3.92	64.12	-	
2	Goalpara	Agia	-	1991	8.15	8.79	79.09	-	Qualifies under criteria No.3 & 4 i. e. average SPR for the last 3 years is 5 or more and Pf% is 30 or more with SPR 3 or more in any of the three years.
				1992	8.31	7.96	85.84	-	
			260	1993	8.63	7.26	88.09	-	
		Matia	-	1991	13.91	1.39	63.80	-	Does not qualify in any of the criteria, although Pf% is 30 or more, but SPR is 3 or less in all the three years and there are no deaths.
				1992	11.91	1.86	68.33	-	
			55	1993	13.77	1.83	71.94	-	
		Mornai	-	1991	10.81	3.97	95.95	-	Qualifies under criterion No.4 i.e. Pf% is 30 or more and SPR is 3 or more in any of the three years.
				1992	9.89	2.21	97.15	-	
			144	1993	12.05	1.96	97.76	-	
3	Darrang	Orang	-	1991	12.31	2.21	7.15	-	Qualifies under criterion No.2. Doubling of SPR during last three years SPR is more than 4 in the last year.
				1992	10.61	3.51	13.23	-	
			219	1993	12.13	4.44	16.14	-	
		Udalguri	-	1991	22.25	22.16	0.39	-	Qualifies under criteria No.1 and 3 i.e. deaths due to malaria in any of the last 3years and average SPR for the last three years is 5or more.
				1992	20.71	23.05	0.40	-	
			277	1993	25.55	24.63	17.34	1	
		Jaljali	-	1991	8.39	0.15	-	-	Does not qualify in any of the criteria because Pf% is less than 30, average SPR less than 5 and there are no deaths.
				1992	7.38	0.18	2.94	-	
			249	1993	9.02	0.45	6.86	-	
		Sipajhar	-	1991	16.20	0.86	2.08	-	Does not qualify in any of the criteria because Pf% is less than 30, average SPR less than 5, SPR does not double and there are no deaths.
				1992	16.71	0.36	-	-	
			91	1993	9.02	0.80	7.69-		

4	Bongaigaon	Bongaigaon	106	1991 1992 1993	12.13 10.86 13.90	0.62 0.70 1.28	100.00 100.00 100.00	- - -	Does not qualify, although Pf% more than 30 but the SPR is less than 3 and there are no deaths.
		Boitomori	89	1991 1992 1993	7.09 14.52 19.63	18.71 7.36 9.78	93.09 90.81 89.90	- - -	Qualifies under criteria No.3 & 4 i.e. average SPR for the last three years is 5 or more and Pf% is more than 30 in any of the last three years.
		Srijangram	215	1991 1992 1993	1.49 7.13 9.94	4.69 0.24 0.58	100.00 78.90 84.80	- - -	Qualifies under criterion No.4. i.e. P.f.% is 30 or more and SPR is 3 or more in any of the three years.
5	Jorhat	Bhagamukh	36	1991 1992 1993	12.11 12.87 12.12	0.20 0.21 0.47	11.11 -- 23.81	- - -	Does not qualify - SPR is low, Pf% is not more than 30 and there are no deaths.
		Kakachari	123	1991 1992 1993	10.56 9.78 10.60	0.02 0.08 0.19	66.67 20.00 15.38	- - -	Does not qualify. although Pf% is more than 30 but SPR is low and there are no deaths.

APPENDIX - I

(TO BE COMPLETED AT PHC LEVEL)

PHC_____ DISTRICT _____ STATE _____

POPULATION (1994) :_____ AREA_____ (sq. km)

TOTAL NO. OF SUBCENTRES_____ TOTAL NO. OF VILLAGES & HAMLETS

S. NO.	Name of Subcentre	No. of villages & hamlets	Year	Sub-centre Population	No. of Blood smears examined	No. of Positives		ABER (%)	SPR (%)	API	Pf%	No. of deaths due to malaria		Remarks	
						Total	Pf					Microscopi-cally confirmed	Only Clinically diagnosed	Sprayed or not	Qualifies as high risk area or not
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1			1992 1993 1994												
2			1992 1993 1994												
3			1992 1993 1994												
4 contd.			1992 1993 1994												
Total															

Note: (1) Enumerated population as per NMEP for the year.

(2) Entries in column 13 are not to be repeated in column 14.

APPENDIX - II (A)

DISTRICT .....

STATE.....

(TO BE COMPLETED AT DISTRICT LEVEL)

POPULATION (1994) :_____ AREA _____ (sq. km.) TOTAL NO. OF PHCs _____ TOTAL NO. OF SUBCENTRES _____

S. NO.	Name of PHC	No. of Sub-centres	No. of villages & hamlets in PHC	Year	PHC`s Total Population	No. of Blood smears examined	No . of Positives		ABER (%)	SPR (%)	API	Pf%	No. of malaria deaths		Remarks
							Total	Pf					Micro-scopically confirmed	Only Clinically diagnosed	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1				1992 1993 1994											
2				1992 1993 1994											
3				1992 1993 1994											
4 contd.				1992 1993 1994											
Total															

Note: (1) Enumerated population as per NMEP for the year,
(2) Entries in column 14 are not to be repeated in column 15.

APPENDIX-II (B)

District..... (To be Completed at District Level) State.....

Population of District_____ Total no. of PHCs _____ Total no. of Subcentres: _____

PHCs and Subcentres of `High Risk` Areas selected for early fever detection and prompt treatment of cases

S.No.	Name of "High Risk" PHC	Pop.	Criteria for selection (number)	FTDs/DDCs		Voluntary Link Workers		Microscopists			Microscopes		
				Reqd.	In position	Reqd.	In position	Reqd.	Sanctioned	In position	Reqd.	Available	Difference
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 2 3 4 5 Contd.													
Total													

N.B. (1) The column "Required" shall be the number as per the norm while "Sanctioned" will mean the posts sanctioned by the State and "in position" denotes number of persons actually working.

(2) The number in col. 4 means serial number of criteria laid down by the Expert Committee for selection of high risk areas.

APPENDIX - II (C)

District..... (To be completed at District Level) State.....

Population of District: _____ Total no. of PHCs _____ Total no. of Subcentres _____

PHCs & Subentres of "High Risk" areas selected for intervention measures - spray operations

High Risk PHCs

S.No.	Name of High risk PHC	Population of PHC at Col. 2	No. of High risk Sub-centres in PHC Col 2	Criterion applicable (Number)	High risk pop. for spray etc. (Total pop. of sub-centres at Col. 4)
1	2	3	4	5	6
1. 2. 3. 4. 5. 6. contd.					
Total					

Summary: Population Selected _____ ; Spray pumps Required _____ ; Available _____ ; Diff. _____

Insecticide required:_____; Remarks on availability of other spray equipments

N.B.(1) The number in col. 5 means serial number of criterion laid down by the Expert Committee for selection of high risk areas.

APPENDIX-II (D)

Distt..... State.....

Population of Distt :.....

(To be completed at District Level)

PHC-wise and subcentre - wise population qualified for spray as per MPO Guidelines

S. No.	Name of the PHC	Population of PHC at column 2	Number of Subcentres having API 2 and above as per MPO Criterion	*Population of Subcentres of Col. 4 qualified for spray	Remarks
1	2	3	4	5	6

* The number of subcentres in Col. 4 and population in Col. 5 of Appendix-II (D) should not include the subcentres and population given in Col. 4 & 6 respectively of Appendix-II (C).

APPENDIX - III

State.....

(To be completed at State level)

Population: _____ Total no. of Districts _____ Total no. of PHCs: _____

Summary of `High Risk` areas selected for Intensified operations

S. No.	Name of District	Total population of District	'High Risk' areas selected				No. of FTDs		No. of Link Workers		No. of MPWs		
			No. of PHCs	Pop.	No. of subcentres	Population	Reqd.	Functioning	Reqd.	Functioning	Reqd.	Sanctioned	In position
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Total													

Microscopists			Microscopes			Total Pop. selected for spray*	Insecticides reqd. in Metric Tons	Pop. selected for antilarval measures	Larvicides/ Biocides required	Pop. selected for personal protection measures (impregnated bednets)	
Reqd.	Sanctioned	In position	Reqd.	Available	Difference					Insecticides reqd.	Bednets reqd.
15	16	17	18	19	20	21	22	23	24	25	26
Total											

N.B. 1. The column "Required" shall be the number as per the norm, while "sanctioned" means the posts sanctioned by the State and "in position" denotes the actual persons working.

2. The population in "column 7" is the total population of high risk PHCs while the population in "column 21" is the total population of high risk subcentres only selected for spray operations.

3.* The population in col 21 is based on the population selected/targeted in col. 5 Appendix-II (D) and col. 6 Appendix-II (C)

Appendix-IV(A)
M.F. - 1

FAMILY HEALTH REGISTER

House No. _____ Area/Village(Locality) _____

Name of PHC_____ District_____ State_____

Sl.No.	Name of the family member	Name of the Head of Family	Whether usual resident (Yes/No)	Age with Sex (Date of birth if possible)	Marital Status	Education	Occupation	Annual Income (in Rs.)	Number of living children M/F
1	2	3	4	5	6	7	8	9	10

Instructions For Filling Up Of Family Health Register

Col. 1 : This should be running number starting from(1) for each family separately.

Col. 2 : Name of all the members of the family should be given in this column. Casual members may also be shown in this column, if they stay for long.

Col. 3 : Head of the family shall be the same for casual members also.
Relationship of the members shown in column (2) should be mentioned here likewise.

Col. 4 : Nature of stay of member may be shown here.In case of wife, son, daughter, etc., it will be a permanent stay and in case any other relation stays for sometime, it will be called as temporary stay.

Col. 5 : The age of each member should be entered in complete years against his/her name. As far as possible the date of birth of the member may also be recorded against his/her name.

Appendix-IV(B)

M.F. - 2

FOR REPORTING OF BLOOD SMEARS BY SURVEILLANCE WORKER / MULTIPURPOSE WORKER / PASSIVE AGENCY / HI / MI

NAME OF SUBCENTRE : _____

NAME OF THE PHC: _____

HEADQUARTERS : _____

POPULATION : _____

CODE NUMBER : _____

Village	No. of the house	Name of Head of family	Name of patient/ person	Age & Sex	Sr.No. of blood smear	Treatment No. of tablets given (4-amino)	Date of Collect-ion	RESULTS					If +ve. Progressive case No.
								P.f.		P.v.	P.m.	Mixed indicate stage	
								R	RG				
1	2	3	4	5	6	7	8	9	10	11	12	13	14

Note: This Proforma should be in triplicate and three copies forwarded to PHC Laboratory Technician who will retain one copy and send the other two to the Surveillance Inspector/Malaria Inspector.

Signature of Microscopist Date of examination by the Microscopist Signature of Surveillance Worker/MPW/SI/MI/Passive agency

Appendix-IV(C)

M.F. 3

TOUR JOURNAL CUM WORK STATEMENT OF SURVEILLANCE INSPECTOR / BASIC HEALTH INSPECTOR / MALARIA INSPECTOR

PHC.:- _____ Name of the Inspector :-_____ Month :-_____

Date	Village visited	Sub-centre	Group No.	If Con-current contacted MPW/SW	If Con-secutive missing visits of MPW/SW	No. of Positives grouped for RT (PC No.)	No. RT given	B.S. Collected from fever cases	B.S. Collected		B.S. Follow up +ve cases	B.S. Total	Antimalarials used		No. of passive agencies, FTDs contacted	Focal spray		Community therapeutic measures (MST) if done - No.
									Mass	Cont-act			4 A.Q.	8 A.Q.		Rooms	Cattle* Sheds	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

* Cattle Sheds are not to be sprayed as per the Expert Committee Report on Malaria-1995.

Appendix-IV(D)

M.F. 3-A

TOUR JOURNAL CUM WORK STATEMENT OF MULTIPURPOSE WORKER/SURVEILLANCE WORKER OF SUBCENTRE

FOR THE MONTH OF _____

NAME OF THE SUBCENTRE _____ NAME OF THE PHC:- _____

HEADQUARTERS :- _____

POPULATION _____ CODE NO. :- _____

Date	Group No.	Village visited	No. of families		Population		No of. fever cases treated without B.S.	No. of B.S. collected	Tablets used 4 AQ.	R.T. done P.C. No.	Tabs. used 8 AQ	Date of despat-ching of B.S.	Passive agency FTDs Panchayats/ teachers contacted	No. of drugs given 4AQ
			Allotted	Visited	Allotted	Visited								
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Month's Total														

Balance Stock in Hand

a) Chloroquine:-.....

b) Sulpha + Pyri :- .....

c) Primaquine:-.....

d) Amodiaquine:-.....

e) Glass sildes:-.....

f) Service stamps:-.....

Certified that I visited all the famillies & entries in my diary are true

Signature of MPW/SW

M.F - 4

MONTHLY REPORT OF MALARIA PROGRAMME OF PRIMARY HEALTH CENTRE

Name of the State:- _____

Name of the Distt:- _____

Total Population:- _____

Sl.No.	Name of PHC/ Sub-centre	Type of malaria paradigm	Total Pop.	ACTIVE Blood Slides			MASS & CONTACT Blood Slides			PASSIVE Blood Slides			TOTAL Blood Slides			AGEWISE POSTIVES				RT Done				Death due to mal.	
				Coll-ected	Exam-ined	Posi-tive	Coll-ected	Exam-ined	Posi-tive	Coll-ected	Exam-ined	Posi-tive	Coll-ected	Exam-ined	Posi-tive	Under 1 Yr.	1-4	5-15	15+	Under 1 Yr.	1-4	5-15	15+	Pf micro-scopically confirmed	only clinically diagnosed
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
TOTAL																									

N.B. : The entries in col. 25 are not to be repeated in col. 26

Appendix-IV(F)

M.F. - 5

MONTHLY REPORT OF MALARIA PROGRAMME OF PRIMARY HEALTH CENTRE

Name of the State:- _____

Name of the Distt:- _____

Sl.No.	Name of PHC	NO. POSITIVE			SPECIES					R.T. Given	Total focal spray of rooms	Total fever cases treated with 4-AQ tabs. single dose w/o B.S	Mass therapeutic measures				Balance Tablets			
		Male	Female	Total	Pv	Pf		Oth-ers	Total				Single dose 4-A.Q.+ 8-A.Q. 600+45 mg mg	Single dose Sulpha + Pyri	R.T. 5 days	Total	4-AQ	8-AQ	Sulpha + Pyri	Quin-ine
						R	RG													
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
TOTAL																				

M.F. 6

MONTHLY REPORT OF MALARIA PROGRAMME
(PROGRESS & ASSESSMENT OF SPRAYING)

Name of the State :-_____

Name of the PHC selected for Spray _____

Name of the District:-_____

Name of the Malaria Inspector:-_____

Total Subcentres _____

Headquarters:-_____

Population:- _____

Sl. No.	Name of Sub-centre	Population	Insecticide used	Period of spraying rounds	Targeted Rooms	Achievements		Balance of Insecticide in M.Tons			
						No. Sprayed	Coverage in%	D.D.T. 50% wp	B.H.C. 50% wp	Malathion 25% wp	Synthetic Pyrethroids (Specify)
1	2	3	4	5	6	7	8	9	10	11	12
A.	Sprayed Subcentres										
1.			1st Rd								
			2nd Rd								
			3rd Rd								
2.			1st Rd								
			2nd Rd								
			3rd Rd								
3.			1st Rd								
			2nd Rd								
			3rd Rd								
B.	Non-sprayed Subcentres										
Total											

Appendix-IV(H)

M.F. 7

DETAILS OF POSITIVES AND REMEDIAL MEASURES

Subcentre:-_____ District/PHC _____

Population:-_____

Code No.:-_____

Sl No.	P.C No.	Source	Group No.	Vill-age	Name of Head of family	Name of Patient	Age	Sex	Code B.S. No.	Date of Collec-tion	Date of exam-ination	Spec-ies	Date of receipt of results by MPW	Radical Treatment		If died— date of death and species
														From	To	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

B.S. Collected				FOCAL SPRAY				TIMELAG BETWEEN		Follow - up smear number and date
Contact		Mass								
No	Result	No.	Result	Date	Targeted Rooms	Sprayed Rooms	% of coverage Rooms	Collection & R T.	Collection and focal1 spray	
18	19	20	21	22	23	24	25	26	27	28

Appendix-IV(I)

M.F. 8

REGISTER OF BLOOD SMEARS RECEIVED & EXAMINED (SUBCENTRE-WISE)

Name of Subcentre:- _____ Name of PHC :- _____

Population:- _____ Year:- _____

Code No.:- _____

Date of receipt	Name of MPW or other agency including FTD etc.	Fever treated w/o B.S. M.S.T. done	Active (A) Sl. No. From	Active (A) Sl. No. To	Active (A) Total B.S.	Passive (P) FTD Sl. No. From	Passive (P) FTD Sl. No. To	Passive (P) FTD Total B.S.	MASS & Contact (M&C) Sl. No. From	MASS & Contact (M&C) Sl. No. To	MASS & Contact (M&C) Total B.S.	Period of collection	Date of examination	*Number of B.S. Examined-Postive A	*Number of B.S. Examined-Postive P	*Number of B.S. Examined-Postive M&C	POSITIVE SPECIES Pv	POSITIVE SPECIES Pf R	POSITIVE SPECIES Pf RG	POSITIVE SPECIES Pm	POSITIVE SPECIES Mixed	SL. No. of positive cases	Date of despatch of report
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Total for the Week																							

*In col. no. 15, 16, 17 - the no. of B.S. examined from Active (A), Passive (P) and Mass & Contact (M&C) are posted. Below these the positives among them are posted in a circle.

Appendix-IV(J)

M.F. 9

EPIDEMIOLOGICAL EVALUATION MASTER REGISTER
(SUBCENTRE-WISE, VILLAGE-WISE & MONTH-WISE)

Name of State:-_____ Name of Subcentre:- _____

Name of Distt:-_____ Code No.:- _____

Name of PHC:- _____

JANUARY*

Sl. No.	Name of Village	Popul-ation	Target B.S.	Fort-night	B.S. Active	AGENCY-WISE, SEX-WISE POSITIVE								AGE-WISE POSITIVE								P.f. rings only	TOTAL Positive	A.P.I.
						ACTIVE		PASSIVE		MASS & CONTACT		Total		P.f. & MIXED				Pv. & OTHERS						
						Male	Female	Male	Female	Male	Female	Male	Female	Under 1-yr.	1 - 4	5 - 14	15+	Under 1-yr	1-4	5-14	15+			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	A			1																				
				2																				
2	B			1																				
				2																				
Total for the month (Blue ink) (Monthly Report)																								
Total in the next month (Red ink) (Supplementary report)																								

*Separate page for each month from columns 5-23 though the list of villages remains common on first page.

Appendix-IV(K)
M.F.-10

PASSIVE AGENCIES INCLUDING FEVER TREATMENT DEPOTS REPORT

Name of PHC: _____ For the month of _____

S. No	Name of agency / FTD	OPD-New cases	No. of fever cases	Fever cases treated with 4-AQ without B.S.	B.S. Collected	Number positive	4 - AQ consumed	Number R.T. given	8 - AQ consumed	Balance of drug	
										4-AQ	8-AQ
1	2	3	4	5	6	7	8	9	10	11	12

Note: FTD will fill up column 5 to 8 and 11

Appendix-IV(L)

M.F.11

SAVINGRAM FROM PRIMARY HEALTH CENTRE

Name Of PHC: _____

Population _____

Sl. No	Name of the Subcentre	Fever treated	B.S. Collected	Positives	SPECIES					Backlog Smears
					Pv	Pf		Pm	Mixed	
						R	RG			
1	2	3	4	5	6	7	8	9	10	11

MEDICAL OFFICER

Copy forwarded to:

1. Zonal Officer (Malaria)
2. Distt Malaria Officer
3. Malaria Inspector

Appendix-IV(M)

M.F. - 12

TOUR REPORT OF DISTRICT MALARIA OFFICER

For the month of _____ Name of PHC _____

A. GENERAL

1. Name of the District
2. Name of the Officer
3. Period since when he is working in the present district.
4. Name of the month to which the report relates.

B. TOUR PARTICULARS

1. Total number of tour days
2. Total number of night halts made outside headquarters
3. Number of workers whose work is inspected concurrently (Give Subcentre names)

C. SURVEILLANCE UNDER ACTIVE:

	Within 1.5 km (one mile) from road	Within 1.5 to 4.5 kms (1-3 miles) from road	Over 4.5 kms (three miles) from road
1. Number of Villages where surveillance is inspected			
a) Consecutively :			
b) Concurrently:			

2. Number of houses inspected _____
3. Average collection of Blood smears per worker during the previous month (———19--in the PHC)
4. Number of workers on whom memos were earlier given for inadequate collection and the level of improvement.
5. Number of workers on whom disciplinary action taken by way of
   i) Cutting of F.T.A.or M.T.A.
   ii) Removal from service.
6. Number of surveillance inspectors whose work is inspected.
7. Whether tour report of S.I. received for the month.

D. SURVEILLANCE UNDER PASSIVE

1. Number of passive agencies including FTDs in the PHC.

2. Number from whom reports received.

3. Action taken on those who have not furnished the reports

4. Number of agencies where blood smear collection is more than 15% of all the cases treated.

5. Action taken on the others

6. Number of passive agencies contacted

E. SPRAYING	Within 1.5 km (one mile) from road	Within 1.5 to 4.5 kms (1-3 miles) from road	Over 4.5 kms (three miles) from road
1. No. of villages inspected for focal spraying			
2. No.of villages inspected for regular spraying and percentage of coverage			
3. Steps taken to have full spray staff in position.			

F. LABORATORY : PHC

1. Whether register MF-8 maintained, if not, what action taken to improve.

2. Whether epidemiolgical evaluation register MF-9 up to date, if not, what steps taken

3. Whether charts are maintained, if not, what action taken to improve

4. Number of cross-check variations received from State lab. & ROH & FW lab. during the month

5. Remedial measures taken for cross-check of positives

G. REMEDIAL MEASURES

1. Number of positives detected in the PHC during the month
2. Number of positives investigated and verified himself
3. Number of cases where remedial measures were inspected and verified.

H. PERIODICALS

1. Monthly technical report received from the PHC and if not, what steps taken
2. Is savingram epidemiological situation being sent regularly ?

I. PEOPLE'S PARTICIPATION

Panchayats, teachers, youth organistations, etc.

Whether account of drug received alongwith the report, if not, what steps taken.

J. ANTIMALARIALS

Quantity of drugs issued to PHC are checked vis-a-vis B.S collected and fever treated, and deficiency detected, measures taken

K. GENERAL

Brief highlights of important events in the PHC. Any subcentre showing abnormal rise in cases- Reasons and action taken

DISTRICT MALARIA OFFICER

M.F. 13

MONTHLY REPORT OF NMEP WORK DONE BY DISTRICT MEDICAL AND HEALTH OFFICER

1. Name of the District
2. Name of the month to which the report relates
3. Particulars of Passive Surveillance in medical Institutions visited by DM & HO during the month

Sl.No.	Name of Institution	Total new cases treated during the year from Jan. up to date of visit	Total B.S. collected during the year from Jan. up to date of visit	Action taken for collection of less than 15% of the new cases treated in OPD	Whether subcentre FHW/ ANM involved in B.S. collection and R.T.
(1)	(2)	(3)	(4)	(5)	(6)

DISTT. MEDICAL & HEALTH OFFICER

The same proforma may be used by Dy. CMO(H)

Appendix-IV(O)

M.F.-14

PARTICULARS OF PRIMARY HEALTH CENTRE VISITED

Sl.No.	Name of PHC	No.of MPWs	B.S. collection by the MPWs from the beginning of the year up to date of visit	Average collection per worker per month	Positives recorded during the year	Number to which R.T. given	Whether cross -check smears are sent to State lab. and ROH & FW lab regularly	Whether Laboratory maintained properly as per instructions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

DISTT. MEDICAL & HEALTH OFFICER

THE SAME PROFORMA MAY BE USED BY Dy. CMO (H)

M.F.-15

ZONAL OFFICER'S ACTIVITIES REPORT FOR THE MONTH OF___199_

District visited_____

Zone_____Period of visit from_____to _____

PART - I

1. STAFF POSITION

(Complete or deficient, if deficient action taken to fill up the same)

2. Surveillance data up to the end of the month (Enclosure No.1) . _____

Enclose separate statement

3. No. of subcentres collecting blood slides _____

a) No. of subcentres collecting more than target _____

b) No. collecting less than target _____

c) Investigations for increase and shortfalls and action taken by the Zonal office to rectify defects _____

_____

_____

4. Laboratory data up to the end of previous month

Technicians , others

a) No. of personnel examining the blood slides with training status _____

b) No. of microscopes and their condition _____

c) No. of blood slides cross-checked _____

1. State or Central Cross-Checking _____

Negative _____

Positive _____

2. ROH& FW Negative _____

Positive _____

Action taken to pinpoint the defaulters

d) Backlog of slides under:

Active _____ Passive _____ Mass & Contact _____

e) Timelag between:
Collection of blood slides & receipt in the Laboratory _____

5. Manintenance of stock register up to the end of previous month:

A) Insecticides _____ Balance on _____

B) Antimalarials: Balance on _____

4-A.Q., _____ 8-A.Q. _____ Sulpha+Pyri _____
Quinine Tab: _____ Any other (Specify) _____

C) Vehicle position:

i) No. of vehicles off road _____

ii) Measures taken to make road worthy _____

a) Monthly Technical Report submitted up to _____

Action taken if delay in submitting _____

b) Annual report submitted for the Year _____

Reasons for non-submission & Action taken _____

PART-II.

Field work for the current month:

1. Number of days toured by th Distt. Malaria Officer _____

2. Number of night-halts made in the district _____ _____

3. (a) Name of the villages visited in PHC,
for checking spray and surveillance: _____ _____

Name of PHC	Within 1.5 km (1 mile) from road	Within 1.5 to 4.5 kms (1 to 3 miles) from road	Over 4.5 kms (3 miles) from road
1	2	3	4

b) For spraying, schedule spray timings and
deviations with reasons _____

c) Epidemiological investigations carried out during the month in
PHC and the number verified by himself _____

4. Institutions visited for passive surveillance checking

PHC _____

Hospitals _____

Dispensaries _____

Steps taken if shortfall _____

5. Contacts made with the District Collectors/Chief Medical Officers/Panchayats, etc.

   a) Progress in Drug Distribution through Panchayats/Teachers.

   b) Assistance in spraying from Panchayats.

PART-III: ADMINISTRATIVE

1. Punishment awarded/recommended to State Malariologist against any member of the staff, if reported no. and date of communication _____

2. Pending, reference on which action is required by the State Malariologist _____

3. Any other point which the Zonal Officer wants to bring to the notice of the DHS/State Malariologist. _____

ZONAL OFFICER (MAL.)

ENCLOSURE - I

ZONAL OFFICER'S ACTIVITY REPORT FOR THE MONTH OF --199--

Part I & II Surveillance Data up to the end of previous Month

	Fever Cases	B.S. Collection	B.S. Examination	Results				Entomo-logical investi-gations
				Pv	Pf	Mxd	Tot.	
Active								
Passive								
Mass & Contact								
Total								

ROGRESSIVE TOTAL UP TO THE END OF PREVIOUS MONTH

Active								
Passive								
Mass & Contact								
Total								

ZONAL OFFICER (MALARIA)

M.F. - 16

FOR REPORTING DRUG DISTRIBUTION CENTRES, FEVER TREATMENT DEPOTS AND MALARIA CLINICS

Name of the State_____ Report for the month of _____

Sl.No.	District	DRUG DISTRIBUTION CENTRES				FEVER TREATMENT DEPOTS				MALARIA CLINICS			
		Number required	Number established	No. of cases attended during the month	Cumulative No. of cases attended up to date	Number required	Number established	Number of cases attended during the month	Cumulative number of cases attended up to date	Number required	Number established	Number of cases attended during the month	Cumulative number of cases attended up to date
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)

FORM - 1

List of the code no. of different vectors, insecticides and various surfaces as given by Computer Maintenance Corporation (C.M.C) for different proformae for entomological data computerisation.

Species & Surfaces code for CMC

CODE NO.	MALARIA VECTORS
01	*Anopheles culicifacies*
02	*An. stephensi*
03	*An. fluviatilis*
04	*An. philippinensis*
05	*An. sundaicus*
06	*An. dirus*
07	*An. minimus*
08	*An. varuna*
09	*An. annularis*
	FILARIA VECTORS
10	*C. quinquefasciatus*
11	*Mansonioides (M) annulifera*
12	*M.uniformis*
	J.E.VECTORS
01	*Culex vishnui*
02	*C. pseudovishnui*
03	*C. tritaeniorhynchus*
04	*C. gelidus*
05	*C. fuscocephala*
06	*C. whitmorei*
07	*C. epidesmus*
08	*C. bitaeniorhynchus*
09	*Anopheles barbirostris group*
10	*An. hyrcanus group*
11	*An. subpictus*
12	*Mansonioides (M) annulifera*
	KALA - AZAR VECTORS
01	*Phlebotomus argentipes*
02	*P. papatasi*
03	*P. sergenti (vector of cutaneous leishmaniasis)*

CODE NO.	TYPE OF SURFACE
01	Mud plastered surface
02	Cemented surface
03	Wooden surface
04	Bamboo surface
05	Thatched surface
06	Others

CODE OF INSECITICIDE

CODE NO.	INSECITICIDE
DDT	DDT
MLN	Malathion
BHC	BHC (HCH)
DLD	Dieldrin
FEN	Fenthion
PIP	Pirimiphos-methyl
DEL	Deltamethrin
CYF	Cyfluthrin
ICO	Lambdacyhalothrin
TEM	Temephos
PRO	Propoxure
FTO	Fenitrothion

Appendix-V(B)

NMEP

COMPUTERISED ENTOMOLOGICAL DATA MONITORING MALARIA & FILARIA VECTOR MOSQUITO (ADULT) DENSITY.

Form - 2

State _____ Record Type - 01

1. District code

2. PHC Name _____
   and Population under spray

3. Locality _____

4. Date of collection ☐☐-☐☐-☐☐☐☐

5. Time of collection ☐☐ morn. ☐☐ eve.

6. Insecticide sprayed (code of insecticide) ☐☐☐

7. Spray coverage % — Population ☐☐☐ Room ☐☐☐ House ☐☐☐ CS ☐☐☐

8. Date of spray ☐☐ Day ☐☐ Month ☐☐☐☐ Year

9. Time spent in hours — Indoors ☐☐☐☐ HRS MTS; Outdoors ☐☐☐☐ HRS MTS

10. Vectors of Malaria

Code	Male	Female	10 man-hour density
☐	☐	☐	☐
☐	☐	☐	☐
☐	☐	☐	☐

11. Other *Anopheles* (specify species) ☐ ☐ ☐ ☐

12. Vectors of Filaria ☐ ☐ ☐ ☐

N.B.- when in a PHC more than one insecticide is used, code of other insecticide(s) also to be written with plus mark.

Appendix-V(C)

N M E P

Computerised Entomological Data Monitoring (ADULT)
Density of Vectors of J.E and Kala-azar.

Form - 3

State _____ Record Type - 01

1. District code

2. PHC Name _____ and total population of PHC

3. Date of collection

4. Time of collection MORN. EVEN.

5. Locality

6. Insecticide sprayed

7. Spray Coverage% Population Room House CS

8. Date sprayed Day Month Year

9. Time spent in hours Indoors Outdoors

10. Vectors of J.E.

Code	Male	Female	10 man-hour density

11. Vectors of Kala - azar

Code no.			Density (P.M.H.)

NMEP

COMPUTERISED ENTOMOLOGICAL DATA MONITORING SUSCEPTIBILITY TEST ADULT MOSQUITO FORM.

FORM-4

State _____

DISTRICT CODE: | | | | | | | | | |

PHC NAME OR NAME OF LOCALITY _____ DATE OF TEST | | | - | | | - | | | | |

DAY MONTH YEAR

EXPOSURE PERIOD : SPECIES CODE | | SPECIES CODE | | SPECIES CODE | | SPECIES CODE | |

	TT	D	% MORT	TT	D	% MORT	TT	D	% MORT	TT	D	% MORT
OC - CONTROL												
DDT 4%												
DL 0.4%												
DL 4%												
OP - CONTROL												
MLN 5%												
FENITRO 1%												
CB - CONTROL												
PROPOXURE												
SP - CONTROL												
DELTAMETHRIN												
CYFLUTHRIN												
LAMBDACYHALOTHRIN												

TEMPERATURE : MAX : MIN :

RELATIVE HUMIDITY

TT = TOTAL TAKEN, D = DEAD, MORT = MORTALITY

Appendix-V(E)

NMEP

COMPUTERISED ENTOMOLOGICAL DATA MONITORING SUSCEPTIBILITY TEST (LARVAL) FORM.

FORM-5

State _____

DISTRICT CODE: | | | | | | | | | |

PHC NAME OR : NAME OF LOCALITY _____ DATE OF TEST | | | - | | | - | | | | |

DAY MONTH YEAR

EXPOSURE PERIOD : MINUTES | | | | |

	SPECIES CODE		SPECIES CODE		SPECIES CODE		SPECIES CODE	
	TT D	% MORT	TT D	% MORT	TT D	% MORT	TT D	% MORT
OP Control :								
Fenthion 0.25 mg./1 :								
Fenthion 1.25 mg./1 :								
Fenthion 6.25 mg./1 :								
Fenthion 31.25 mg./1 :								
Temephos 1.25 mg./1 :								
Temephos 6.25 mg./1 :								
Temephos 31.25 mg./1 :								
Temephos 156.25 mg./1 :								
Other larvicides :								

Temperature Maximum Minimum

Relative humidity

TT = Total taken D = Dead MORT.= Mortality

Appendix-V(F)

N M E P
COMPUTERISED ENTOMOLOGICAL DATA MONITORING-DISSECTION FORM.

FORM-6

State

DISTRICT CODE : ☐☐☐

DATE : MONTH YEAR : SPECIES CODE :

PHC NAME

ABDOMINAL CONDITION (GIVE NUMBER OF MOSQUITOES)		UF	F	SG	G
DISSECTION	NO.DISSECTED	GUT ☐☐☐☐	NO+VE ☐☐	NO.DISSECTED GLAND ☐☐☐	NO.+VE ☐☐
OVARIAN DISSECTION	NO.DISSECTED	☐☐☐☐	NO.NULLIPAROUS ☐☐☐☐	NO.PAROUS P1 P2 P3 P4 ☐☐☐☐	
FILARIA	NO.DISSECTED	☐☐☐☐	NO. +VE FOR Mf ☐☐	I II III III ONLY ☐☐☐☐ ☐☐	

NO. +VE FOR INFECTION WITH LARVAL STAGES

AVG. NO. OF INFECTIVE LARVAE PER INFECTIVE MOSQUITO ☐☐

P1.....4 = PAROUS 1, 2, 3 ,4
F = FULL FED
G = GRAVID
UF = UNFED
SG = SEMI GRAVID

Appendix-V(G)

N M E P
COMPUTERISED ENTOMOLOGICAL DATA MONITORING
WHOLE NIGHT VECTOR BITING COLLECTION

FORM - 7
RECORD TYPE - 01

STATE

DISTRICT CODE | | | | | | | | PHC NAME | | | | | | | | | | | |

DATE | | | - | | | - | | | | |

DAY MONTH YEAR

NO.OF HUMAN BAITS | | NO. OF ANIMAL BAITS | |

WEATHER CONDITIONS (TICK MARK) - WINDY | | RAIN | | NO WIND | | FOG | | CLOUDY | |

NIGHT HOURS OF COLLECTION	VECTORS COLLECTED PER HUMAN BAIT				VECTORS COLLECTED PER ANIMAL BAIT				AEDES COLLECTED PER BAIT			
	INDOOR		OUTDOOR		INDOOR		OUTDOOR		HUMAN		ANIMAL	
	VECTORS CODE-WISE		VECTORS CODE-WISE		VECTORS CODE-WISE		VECTORS CODE-WISE		INDOOR	OUTDOOR	INDOOR	OUTDOOR
18-19 HOURS												
19-20												
20-21												
21-22												
22-23												
23-00												
00-01												
01-02												
02-03												
03-04												
04-05												
05-06												

N.B.-Per HUMAN OR ANIMAL BAIT COLLECTED VECTOR NIGHT HOURWISE TO BE WRITTEN BELOW THE CODE OF VECTOR (IN VERTICAL DIRECTION)

NMEP

COMPUTERISED ENTOMOLOGICAL DATA MONITORING SPACE SPRAY TOTAL CATCH (PYRETHRUM SPRAY)

FORM-7a

1. State _____ PHC Name _____ Date ☐☐-☐☐-☐☐☐☐ (Day Month Year)

2. District code ☐☐☐☐☐☐

3. Time of collection ☐ Morn. ☐ Even.

4. Date of last spray and code of insecticide ☐☐-☐☐-☐☐☐☐ ☐☐

5. Place of collection ☐ Human Dwelling ☐ M.D. ☐ Cattle Shed

6. Total Number of Mosquitoes collected Species wise

Malaria vectors		Other Anophelines		Culicine		Kala-Azar vectors	
Code	No. collected	Name or code	No. collected	Name or code	No. Collected	Code	No. Collected
☐☐	☐☐☐	☐☐	☐☐☐	☐☐	☐☐☐	☐☐	☐☐☐
☐☐	☐☐☐	☐☐	☐☐☐	☐☐	☐☐☐	☐☐	☐☐☐
☐☐	☐☐☐	☐☐	☐☐☐	☐☐	☐☐☐	☐☐	☐☐☐
☐☐	☐☐☐						

7. Weather Conditions:- Windy ☐ Rain ☐ Dry ☐ Cold ☐ Hot ☐

Appendix-V(I)

FORM-8

NMEP
COMPUTERISED ENTOMOLOGICAL DATA MONITORING
CONTACT BIO-ASSAY FORM.

State _____

District code _____ : Date: Month: Year: Species code: surface code:

PHC name _____ :

Insecticide sprayed (write code) : ☐☐ Date sprayed: Exposure period:

Abdominal condition (Female) : Full fed ☐ Unfed ☐ Gravid ☐

Control : No. exposed ☐ No. Dead ☐ %Mort ☐

On contact surfcace : No. exposed ☐ No. dead ☐ % Mort ☐

Temperature : Relative Humidity

NMEP FORM-9

COMPUTERISED ENTOMOLOGICAL DATA MONITORING MOSQUITO LARVAL COLLECTION FORM

State _____

1. District code ☐☐☐☐☐☐

2. Name of Locality _____

3. Name of PHC _____

4. Date of collection ☐☐-☐☐-☐☐☐☐
   Day Month Year

5. Distance from nearest house (In metres) ☐☐☐

6. Breeding places	No. checked	No. found positive with species of mosquito (code)	
		Vector mosquito code	Other mosquito species (Give name)
-Sullage water drains	☐	☐☐☐	☐☐☐
-Cess pits	☐		
-Cess pools	☐		
-Septic tanks	☐		
-OHT	☐		
-Cisterns (Fresh water)	☐		
-Barrels	☐		
-Earthen pitchers/containers	☐		
-Rejected Tyres/Utensils	☐		
-Ornamental tanks	☐		
-Wells-unused	☐		
-Wells-used	☐		
-Fresh water channels	☐		
-Irrigation canals	☐		
-Seepage water	☐		
-Rice fields	☐		
-Lakes	☐		
-Pit/low lying water collections	☐		
-Rain water collections	☐		

N.B. - Number of breeding places found positive in each type is to be written under the mosquito code.

Appendix-V(K)

FORM-10

NATIONAL MALARIA ERADICATION PROGRAMME
COMPUTERISED ENTOMOLOGICAL DATA MONITORING
ANALYSIS OF BREEDING PLACES POSITIVE WITH MOSQUITO BREEDING

District code [ ] Locality_____ State_____ Date of collection_____

PHC Name _____

PER DIP DENSITY IN + VE BREEDING PLACES

	Sullage water drains	Septic Tanks	Cesspits	Cesspools	OHT	Cisterns/ Barrels	Ornamental Tanks	Wells	Irrgn. Canal	Seepage Water	Rice Fields	Lakes	Rain Water Collcn.	Rejected Tyres, Utensils
ANOPHELES														
[ ] Vector species code														
L-I-II														
L-III-IV														
PUPA														
Other species														
L-I-II														
L-III-IV														
Pupa														
CULEX														
[ ] spec:														
L-I-II														
L-III-IV														
PUPA														
AEDES														
[ ]														
L-I-II														
L-III-IV														
PUPA														

N M E P

Appendix-V(L)

FORM - 11

COMPUTERISED EPIDEMIOLOGICAL DATA MONITORING

STATE _____ DISTRICT CODE | | | | | PHC CODE | | | | | |

		-				

MONTH YEAR

EPIDEMIOLOGICAL DATA FOR 2 YEARS (COMPARATIVE)

1. POPULATION OF PHC | | | | | | | |

2. BS COLLECTED AND EXAMINED	- CURRENT YEAR		
(PROGRESSIVE)	- PREVIOUS YEAR	COMPARATIVE	
3. TOTAL MALARIA POSITIVE CASES	- CURRENT YEAR		
	- PREVIOUS YEAR	COMPARATIVE	
4. NUMBER OF *P. falciparum* CASES	- CURRENT YEAR		
	- PREVIOUS YEAR	COMPARATIVE	
5. ABER	- CURRENT YEAR		
	- PREVIOUS YEAR	COMPARATIVE	
6. API	- CURRENT YEAR		
	- PREVIOUS YEAR	COMPARATIVE	
7. SPR	- CURRENT YEAR		
	- PREVIOUS YEAR	COMPARATIVE	
8. SfR	- CURRENT YEAR		
	PREVIOUS YEAR	COMPARATIVE	
9. SPRAY DURING CURRENT YEAR	- NO. OF ROUNDS SPRAYED		
	- TYPE OF INSECTICIDE USED CODE		
	- DATE OF SPRAY		

DAY MONTH YEAR

Appendix-VI(A)

UM Proforma - I

National Malaria Eradication Programme
Urban Malaria Scheme

Monthly Technical Report for the month of _____

(To be sent to the Director, NMEP, ROH & F.W., Programme Officer of the State and District Medical Officer by 10th of the following month).
by Malaria Inspector.

State _____ District _____ Unit/Town _____

Complete postal address _____

Telephone No. _____

Monthly Technical Report on Larvicidal Treatment of mosquito breeding sources

No. of men working		Breeding places checked & treated		Larvicides	Approx. area in hectares or in running Kilometres	Opening balance	Quantity consumed in ltrs.	Quantity received during the month	Balance at the end of the month	Minor Engineering works done.		NO. of wells or pools where Gambusia or Guppy introduced	Remarks
SFW	FW	Type	No.							Type	Approx sq. mtrs		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
				1.MLO 2.Fenthion 3.Temephos 4.Paris green 5.B. sphaericus 6.B. thuringiensis 7.AGLF 8.Others (Specify)						Canalisation Desilting Deweeding Filling Others			

Please strike off whichever is not applicable

Appendix-VI(B)

UM Proforma - II

National Malaria Eradication Programme
Urban Malaria Scheme

Monthly Technical Report for the month of _____

Monthly Technical Report on Cross-checking work carried out and to be sent to the Director, NMEP, R..O.H. & F.W., State Programme Officer and District Medical Officer by 10th of the following month

by : 1. Malaria / Filaria Inspectors 2. Verified by Biologist

State _____ District _____

Complete postal address _____

Ward/ Sector	Type of breeding places checked	No. of places checked for each type	Places found positive for breeding	No. found not treated	No. found with mosquito breeding								Remarks
					No. of dips applied	Culex Per dip density			No. of dips applied	Anopheles Per dip density			
						L I - II	L III - IV	Pupa		L I - II	L III - IV	Pupa	
1	2	3	4	5	6	7	8	9	10	11	12	13	14

REMARKS _____

Signature of Biologist / I/c Unit

Appendix-VI(C)

UM Proforma -III

National Malaria Eradication Programme
Urban Malaria Scheme

Monthly Technical Report for the month of ----------

(to be sent to the Director NMEP, ROH & FW., State Programme Officer and District Medical Officer by 10th of the following month)
by Malaria Inspector / Filaria Inspector

State_____ District_____ Unit / Town _____

Complete postal address _____

Monthly Technical Report of space spray carried out

Incidence

Stock of P.E. / K. Oil

During the month	Progressive total for the year		Pyrethrum extract 2%	Kerosene Oil
No. of fever cases reported		1. Opening balance of the month		
No. of B/slides collected		2. Received during the month		
No. found +ve for malaria.	Pf.	3. Consumed during the month		
	Pv.	4. Balance at the close of the month		
	Mixed			

Treatment given
i) Radical
ii) Presumptive

Ward/Sector _____ No. of houses given space spray_____ Quantity of material used

Pyrethrum Extract_____ Kerosene Oil _____ Remarks_____

Signature of Biologist / I/c Unit

Appendix-VI(D)

UM Proforma - IV

National Malaria Eradication Programme
Urban Malaria Scheme

Monthly Technical Report for the month of ----------

(Mosquito collection & dissection report to be sent monthly to reach DMO, AD (PH) ROH & F.W. and Director, NMEP, Delhi by 10th of the following month)

By Insect- collector

State _____ District _____ Unit/Town _____

Mosquito collection _____

Species	No of Insect Collectors in position	Fixed Catching Stations			Random Catching Stations			Total				Density per 10 man hours
		Time spent	No. colleced		Time Spent	No. collected		Time Spent	No. Collected			
			M	F		M	F		M	F	Total	
1	2	3	4	5	6	7	8	9	10	11	12	13
An. culicifacies												
An. stephensi												
Other *Anopheles*												
C. *quinquefasciatus*												
An. *aegypti*												
Other *Culex*												

Appendix-VI(E)

UM Proforma -V

National Malaria Eradication Programme
Urban Malaria Report

Monthly Technical Report showing staff position, equipment, utilisation and consumption of DEC, Chloroquine and Primaquine tablets for the month of .....

(to be sent monthly to DMO, AD (PH) and Director NMEP as well as ROH & FW by 10th of the following month)

State_____ District _____ Unit/Town_____

---

1. STAFF

a) Persons Untrained (No.)
   i) Medical Officer/ Biologist
   ii) Inspectors & Technicians

b)

Vacancies Name of the post	No of posts Sanctioned	in position
1		
2		
3		

II. EQUIPMENTS

Item	No. in hand	No. in use	No. not in use and since when	Remarks
1. Jeeps				
2. Trailers				
3. Dissecting microscopes				
4. Compound Microscopes				
5. Hand Compression sprayers				
6. Knapsack sprayers.				
7. Oil drums				

III. CONSUMPTION OF CHLOROQUINE, DEC TABLETS

	Chloroquine	Primaquine	DEC	Others (specify)
1. Opening balance at the beginning of the month				
2. Received / purchased during the month.				
3. Total (1 & 2)				
4. Stock consumed / diverted during the month				
5. Balance in hand at the end of the month.				

Appendix-VI(F)

UM Proforma -VI

National Malaria Eradication Programme
Urban Malaria Scheme

Monthly Technical Report for the month of ----------

(To be sent to the Director NMEP, ROH & FW, State Programme Officer and District Medical Officer by 10th of the following month)

State_____ District_____ Unit/ Town _____

Cross-Checking and remedial measures

Sl. No.	Ward / Sector	Type of breeding sources	Type of remedial measure now taken	Timelag between reporting of breeding & treatment	Disciplinary action taken against defaulters	Remarks
1	2	3	4	5	6	7

Appendix-VI(G)

UM Proforma -VII

URBAN MALARIA SCHEME

MONTHLY MOSQUITO DENSITY PROFORMA (CONCISED)

To be sent to DMO, AD(PH) R.O.H. & FW and Director NMEP

State_____ Month_____ Year _____

Adult density per man hour (Average worked out from fixed and random catching stations as recorded in the register)

A. culicifacies	*A. stephensi*	Other *Anopheles*	*Culex quinquefasciatus*	*Aedes aegypti*	Other *Culex*	Remarks for not recording mosquito density
1	2	3	4	5	6	7

Larval density per dip (Average worked out from weekly reports)

Anopheles larvae	*Anopheles* Pupae	*Culex* larvae	*Culex* Pupae	Remarks
1	2	3	4	5

Appendix-VI(II)

UM Proforma - VIII

URBAN MALARIA SCHEME

STATEMENT OF MONTHLY EXPENDITURE AND STAFF POSITION

(To be sent to DMO, AD (PH), ROH & FW & Director, NMEP)

State_____ District_____ Unit / Town _____

Month_____ Year_____

Sl. no.	Staff Position		Expenditure on pay of all staff	Progressive total of expenditure on staff	Remarks
	No. sanctioned	No. in position			
1	2	3	4	5	6

FIG-4: IN-VIVO RESISTANCE STATUS TO CHLOROQUINE

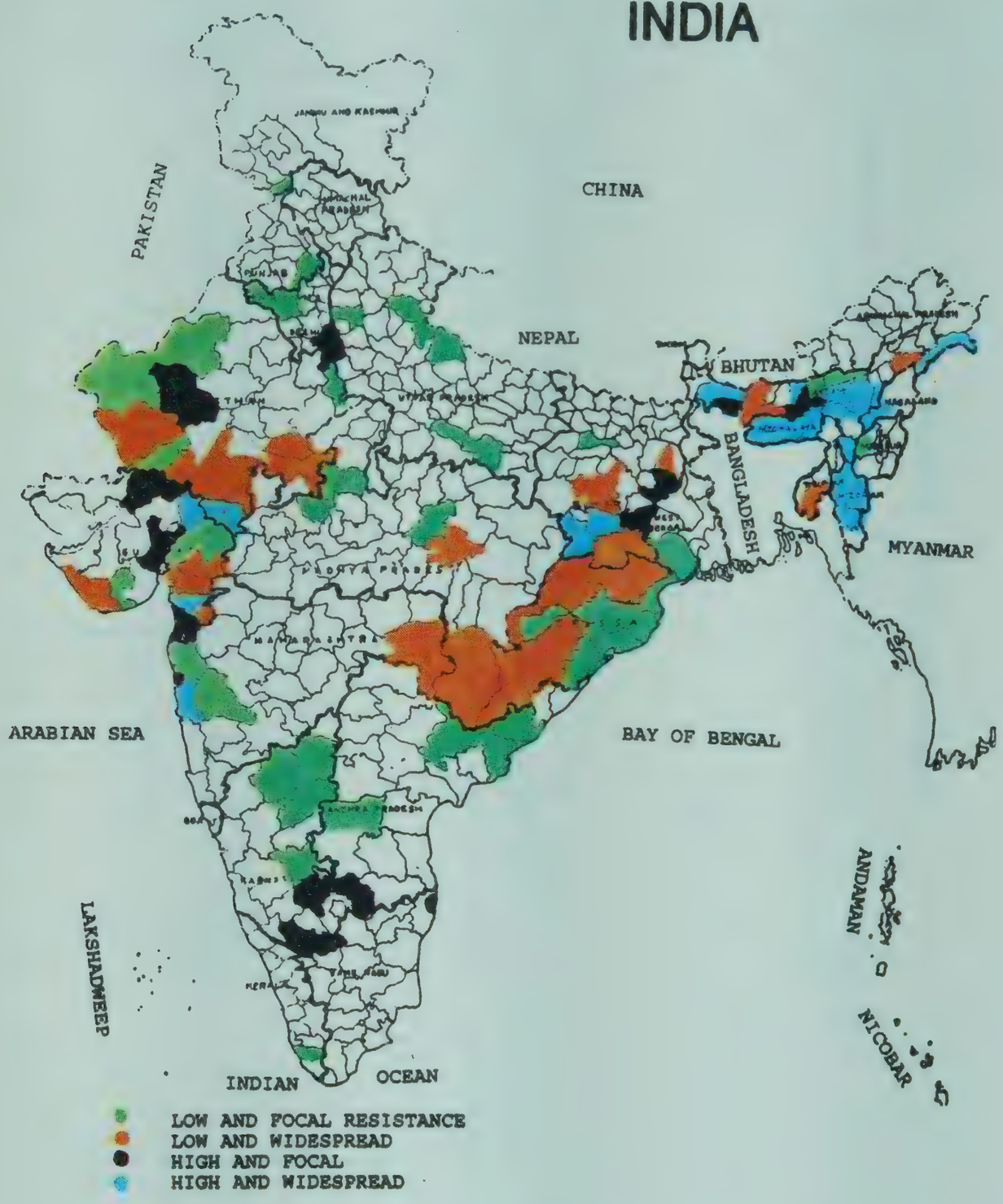


CHART NO. 2
BASIC DATA

1. Name of PHC
2. Population
3. Area in Square Kilometres
4. No. of Villages
5. No. of Paras (Hamlets)
6. No. of desert Villages
7. No. of Gram Panchayats
8. No. of Mini/New PHCs
9. No. of Dispensaries
10. No. of Subcentres
11. No. of Fever Treatment Depots.(FTD)
12. No. of Drug Distribution Centres.(DDC)
13. No. of CHVs..... No. of Voluntary Link Workers (VLW).....
14. Schools — No. — No. of Students
    A) Primary Schools
    B) Middle Schools
    C) High Schools
15. No. of weekly Markets
16. No. of Families
17. No. of Human Dwellings
18. No. of Rooms
19. No. of Couples
20. No. of Wells
21. No. of other permanent water collections

CHART No. 3

Appendix-VII(C)

Information Regarding Passive Agencies

Name of PHC _____

S. No.	Name of Agency	JANUARY					February to December	TOTAL				
		Coll.	Exam.	P.v.	P.f. / Mix.	Total		Coll.	Exam.	P.v.	P.f. / Mix.	Total
Total												

CHART No. 4

Appendix-VII(D)

Passive Agency Chart for PHC Hq. Collection

Name of PHC _____

Month	Total Cases	New Cases	Fever Cases	B.S. Collected	RESULT					R. T. DONE					Remarks
					P. v.	P.f.		Mix	T	P. v.	P.f.		Mix	T	
						R	RG				R	RG			
January															
February															
March															
April															
May															
June															
July															
August															
September															
October															
November															
December															
Total :															

CHART NO.5

Chart showing total collection Subcentre-wise & Month-wise and Positives detected

Name of the PHC_____

S.no.	Name of Subcentre	Pop.	JANUARY					February to December	TOTAL for the year				
			B.S. Coll.	P.v.	P.f.	Mix.	Total		B.S. Col.	P.v.	P.f.	Mix.	Total
1.	2.	3.	4.	5.	6.	7.	8.	9 to 63	64	65	66	67	68
TOTAL													

Note : The month-wise entries of Blood Smear collection and positive will be compiled according to date of collection of Blood Smear.

CHART No.6

Fortnightly Active Collection

Name of PHC _____

PHC population _____ **PHC Target** _____

S.No.	Name of Subcentre	Population	Target	B.S.Collected				
				January		February to December	Total for the year	
				I	II		I	II
1	2	3	4	5	6	7 to 28	29	30
TOTAL								

Similar cols. for each month as in January from Feb. to Dec.

CHART NO. 7

Appendix-VII(G)

Backlog chart of blood smears collected during the month for the year_____

Name of PHC_____

Month	B.S.	Blood Smear Examination												Total	Difference
		Month													
	Coll	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.		
January															
February															
March															
April															
May															
June															
July															
August															
September															
October															
November															
December															
TOTAL															

Note : The record of blood smears collected in the preceding year and examined during the current year should be maintained in separate registers.

Appendix-VII(H)

CHART NO. 8

Backlog chart of Positive Cases detected & R.T. given during the month for the year_____

Name of PHC_____

Month	Total positives detected			R.T. done during the month				Total			Difference
				January			February to December				
	P.v.	P.f. / Mix	Total	P.v.	P.f. / Mix	Total		P.v.	P.f. / Mix	Total	
January											
February											
March											
April											
May											
June											
July											
August											
September											
October											
November											
December											
TOTAL											

CHART No. 9

Appendix-VII(I)

Date_____ TECHNICIAN'S DAILY DIARY Name of PHC _____

S. No.	Code No. of B.S.	QUALITY of Thick Smear	QUALITY of Staining	Result	S. No.	Code No. of B.S.	QUALITY of Thick Smear	QUALITY of Staining	Result

A) Write result of individual blood slide.

B) If no blood slide examined, then indicate whatever work done; such as staining, etc.

ONE SHEET FOR EACH DATE

CHART No. 10

Daily receipt, examination, balance and positives

Name of PHC _____

Date	B.S. Received				Progressive B.S. Receipts				Total B.S. Examined				Back-log				Daily Positives				Progressive Positives			
	A	P	M	T	A	P	M	T	A	P	M	T	A	P	M	T	A	P	M	T	A	P	M	T
Total																								

ONE SHEET FOR EACH MONTH

A - ACTIVE, P - PASSIVE, M - MASS & CONTACT, T - TOTAL

Appendex-VII(K)

REGISTER

DDC/FTD Register-Collection

Name of the PHC _____

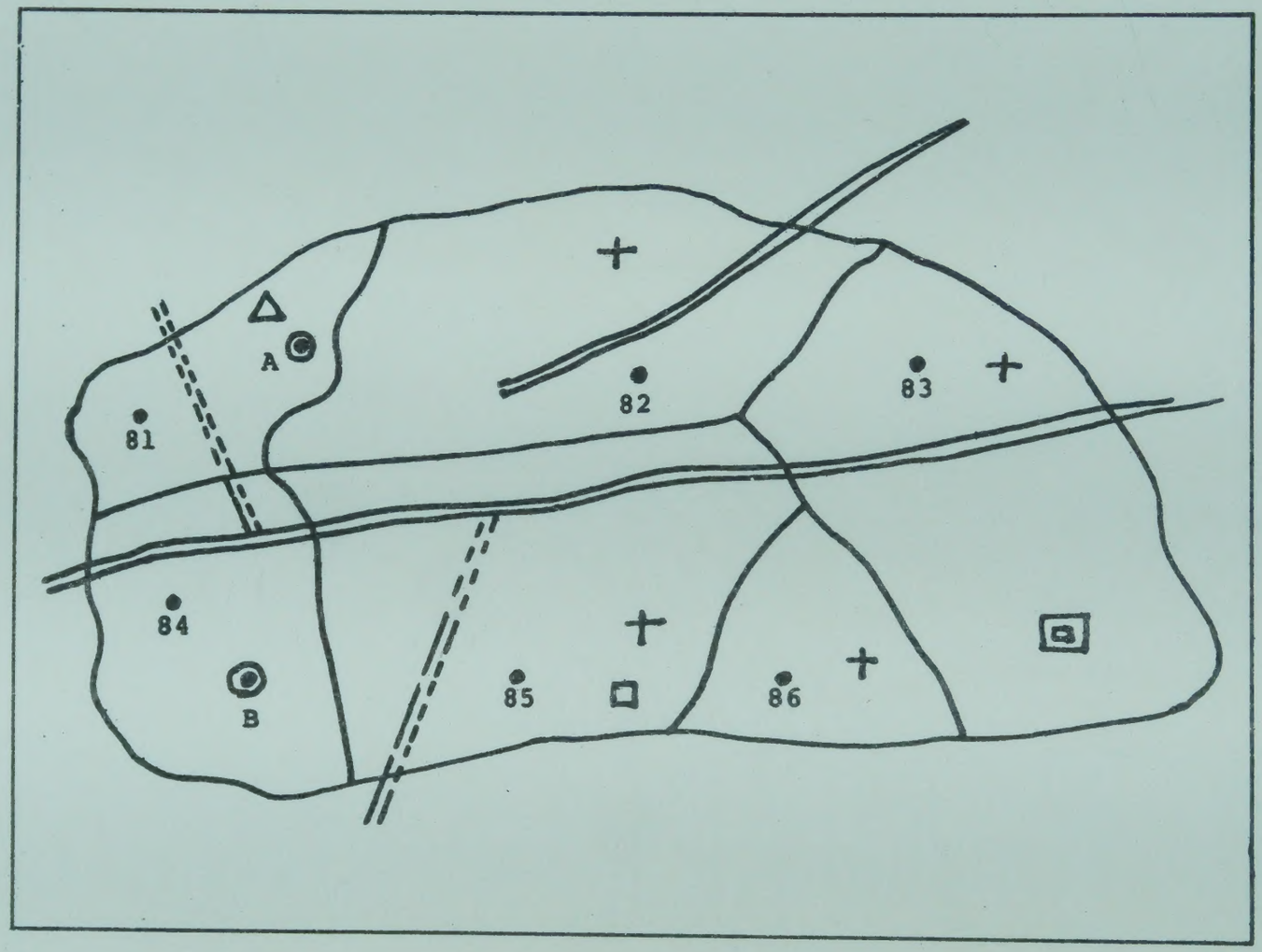
Name of the Village _____

Date of visit of MPW	Fever Cases	Blood Slides	Tablets Consumed	Tablets Replaced	B. S. Taken by MPW	Remarks
Total						

ONE PAGE FOR EACH FTD/DDC

CHART No. 1

MAP OF PHC

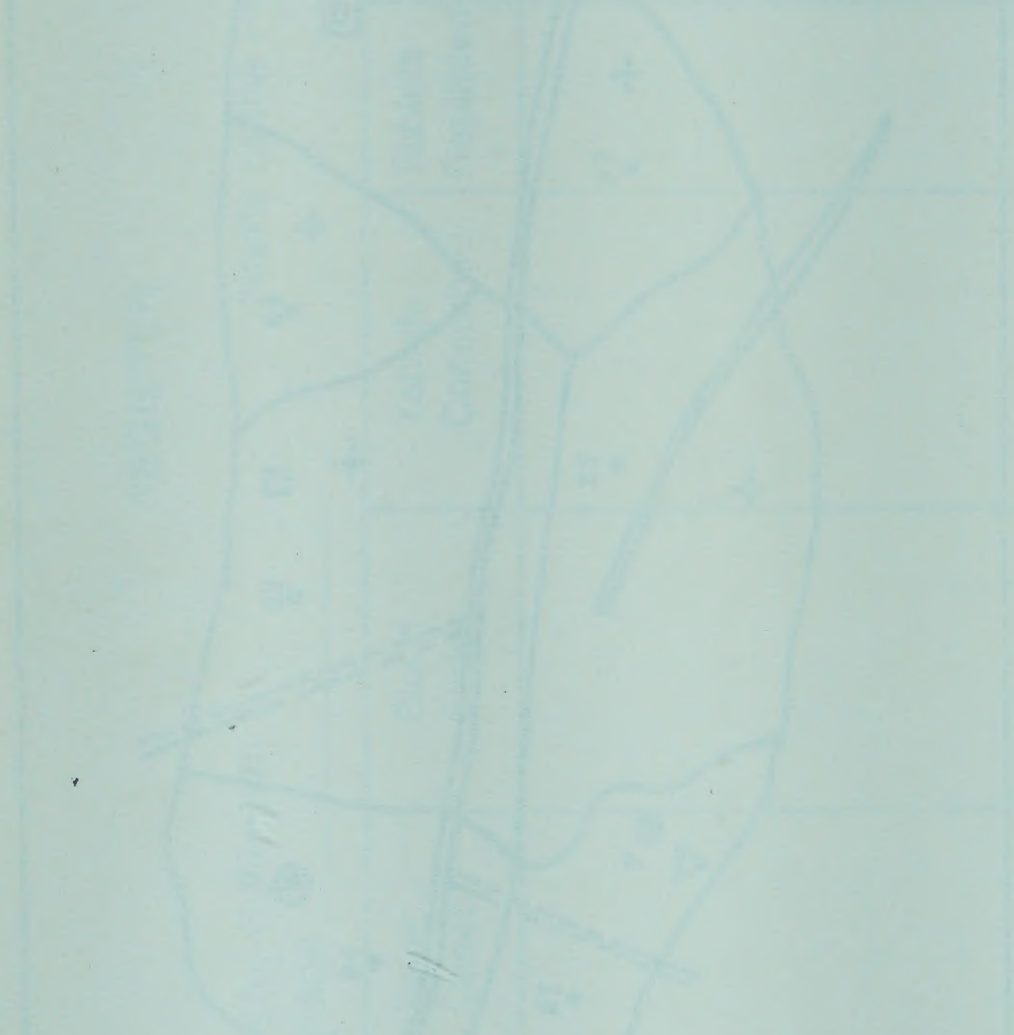


POPULATION

Index

1. PHC
2. Sector
3. Section
4. Population
5. Area in Sq. Kms.
6. No. of Villages
7. No. of Paras (Hamlets)
8. No. of Human Dwellings
9. No. of Families
10. Sub-Centre
11. Mini PHC
12. Ayurvedic Dispensary
13. All-weather Dispensary
14. Fair-Weather Roads
15. Rivers/Streams

NOTES



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